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The Investigation of Disease in Swine *

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KING'S LYNN

The Government has recently appealed for a supreme effort in the agricultural industry and it is significant that it is to an increase in livestock that most appeals have been made. Mr. James Turner, in accepting the Government's challenge on behalf of agriculture, said, "The spreading of breeding pigs over as many of Britain's farms as possible is vital." The recent increase in the price of store pigs at our local markets is an indication of the response the farming industry is making in its efforts to reach its target of a trebled output of pig meat during the next five years.

No exact figures of the losses which may be attributed to pig diseases are available, but from certain surveys it is known that out of every ten pigs born, only eight survive at weaning time and that out of the eight survivors one more dies before marketing. In 1938, there were 450,000 breeding sows in this country. Presuming that the average litter was ten twice yearly, and bearing in mind the value of pigs during the year, such losses would have amounted to £5,500,000. When one realises that these losses do not include those due to outbreaks of the major infectious diseases such as swine fever, swine erysipelas, etc., it is easy to see the tremendous contribution which our profession can make and must make to the industry in its present rejuvenation.

When we are investigating disease in swine, however, we suffer from two very serious handicaps, *viz.* :—

1. Our meagre knowledge of some of the diseases of pigs, due to lack of research, and
2. The bogy of swine fever.

Realising the significance of these handicaps, I feel that the task I have set myself to-day in addressing you on this subject is not an enviable one, but should you give me a very severe "gruelling" in the subsequent discussion I will be able to satisfy my conscience by blaming my lack of knowledge to the present lack of incentive given to the research worker coupled with the reluctance of the Animal Health Branch of the Ministry of Agriculture to publish statistics and official trends of thought regarding the problems connected with the notifiable diseases.

I propose to discuss my subject under the following headings :—

A. Procedure on the Farm.

1. The examination of ailing pigs.
2. *Post-mortem* examination.

B. Procedure in the event of an indefinite Diagnosis.

1. Reconsideration of case history.
2. Reconsideration of *post-mortem* findings.

INTRODUCTION

There is, I am sure, no need for me to remind you that owing to the periodic recurrence of serious outbreaks of swine fever in this country it is very important that the utmost care be taken to avoid the unnecessary spread of this disease when making any investigation into the cause of death or illness in pigs. Owing to the ease with which it may be conveyed by persons or objects which have been in contact with diseased pigs or their excreta very strict precautions must be taken on every occasion. Rubber gloves, rubber boots and a mackintosh coverall should be worn immediately on arrival at the farm and on completion of the enquiry care must be taken to wash and disinfect them. Similar precautions must be taken with any instruments used in slaughtering or making *post-mortem* examinations. The washing and disinfection of the hands and boots of attendants also must be carefully supervised. I am sorry to deal at such length with a procedure which must appear very elementary to you, but in my opinion, there is nothing which will damage the reputation of a practitioner so quickly or prove so detrimental to the profession as a whole in the eyes of the general public as the spread of swine fever from one farm to another by wanton carelessness on the part of a visiting veterinary surgeon.

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A. Procedure on the Farm

When commencing an enquiry at a farm a general picture of the circumstances attending the outbreak should first be obtained from the owner or attendants, with particular reference to the number of pigs which have died, the duration of their illness, the symptoms shown, and the time they have been in the owner's possession. All the pigs should then be inspected, those believed to be healthy being inspected first. During this inspection the opportunity will occur also to make brief enquiries regarding the methods of feeding and management.

(1) THE EXAMINATION OF AILING PIGS

Attention should first be paid especially to the interest the ailing pigs show in their general surroundings. Are they dull and dejected in appearance, with straight tails, preferring to bury themselves in the bedding rather than to come up to the food trough at the rattle of the feeding pail? Have they any unusual gait; How do their respirations compare with those of the more healthy pigs in the sty? Have they any cough, especially on exertion? Do they scour or are they constipated? What is the appearance of the dung in the sty? If the history regarding their appetite appears unreliable, food should be offered them and notice taken as to whether they have complete anorexia, normal appetite, or whether after apparent keenness for food they take only one or two mouthfuls and then go and lie down. The sty should then be entered and the temperature of one or two of the pigs taken without unduly exciting them. This procedure may be facilitated by gently rubbing the pig's back with the hand or by penning one or more pigs into a corner of the sty by means of a gate or hurdle. The appearance of the skin of any ailing pigs should then be carefully noted, special attention being paid to the abdomen, thighs and axillary regions for evidence of haemorrhages, raised lesions, greasiness, yellow or other coloration, etc., and the ears should be examined for red or purple coloration, haemorrhages, etc. Due allowance must be made for redness of the ears caused by handling by the attendants. In the case of black pigs it is very important that the skin along the back and sides should be carefully palpated for raised lesions, indicative of swine erysipelas, otherwise such lesions might easily pass unnoticed.

(2) *Post-mortem* EXAMINATION

On completion of the examination of the ailing pig, a *post-mortem* examination should be made of any pigs which have died, and if necessary the owner's consent should be sought to slaughter one or more of the ailing pigs for this purpose. If, from the history of the case, and the appearance of the carcase, there is any reason to suspect anthrax, a microscopical examination should be made of smears made from the submaxillary lymphatic glands and only when the non-existence of this disease has been definitely established should further examination be continued. To lessen the risk of the unnecessary spread of other infections the unopened carcase should, if possible, be removed to the site where it is proposed to bury it, care being taken to choose ground not frequented by other pigs, nor situated near any drain, dyke or stream. Similarly, ailing pigs should be moved before they are slaughtered. In such instances, where owing to the size of the animal, difficulty is experienced in moving it, a rope should be looped around the upper jaw, held slack, and the pig driven to the spot. If the rope is then held tightly by one or more of the attendants, the pig will usually pull on the rope and keep its head sufficiently still to enable a humane-killer to be applied.

The attendant having brought two buckets of water, soap and a towel, the *post-mortem* examination is then commenced. When a carcase of a pig is being examined which was dead before one's arrival at the farm, the extent of *post-mortem* decomposition should be observed and borne in mind later, particularly when interpreting the significance of the macroscopical appearance of the internal organs. The appearance of the skin, eyes, ears, nostrils, mouth, anus, vulva and scrotum should now be observed. Thus, intense paleness of the skin may indicate internal or external haemorrhage, or visceral congestion. Yellowness indicates icterus or anaemia; deep blue or purple may indicate cyanosis or specific disease such as swine erysipelas or swine fever. If cyanosis is suspected the cardiac and respiratory systems should be carefully examined later for evidence of valvular disease of the heart, pleurisy, pneumonia, or

pressure upon the diaphragm caused by distended abdominal organs. Redness of the skin may be due to hyperaemia associated with acute disease or sunstroke, but care must be taken not to confuse it with the red coloration frequently seen as a *post-mortem* change. Careful examination of the visible mucous membranes for congestion, haemorrhage or purulent discharge may act as a valuable guide when examining the internal organs.

There are several ways of opening a carcase; suffice it to say that whatever method is adopted, *post-mortem* examination must be thorough, and throughout the procedure, continual observation must be made for pathological changes however slight. Whilst the organs are being removed from the body care must be taken to observe the quantity and consistency of any fluid in the abdominal, pleural and pericardial cavities and the peritoneum and pleurae should also be carefully examined for the presence of any haemorrhages or fibrin foundation or adhesions. When removed the organs should be placed on a door or bench, or on a sack and left reasonably free from contamination with soil, straw, etc. After their removal all the organs should then be carefully examined. *The stomach* should be completely opened along its greater curvature, and the quantity and nature of the contents observed. The thickness of the gastric wall should be noted and its mucous membrane examined for evidence of pathological congestion, haemorrhages, diphtheresis, parasites, etc. *The small intestine* should be opened with the bowel scissors, the presence of any parasites observed, and the mucosa examined for evidence of haemorrhages, areas of congestion, diphtheresis, etc. The intestinal contents should also be observed. The coils of *the large intestine* should then be disengaged by bluntly dissecting through the mesenteric attachments. The loop of the large intestines left, can then be readily separated and the bowel washed and examined. Care should also be taken to examine it for evidence of injection, petechial haemorrhages, ecchymosis, ulceration or diphtheresis, etc. It is important that the colon should be opened throughout its entire length, for although the caecum and first part of the colon are the commonest sites for the swine fever ulcer, it sometimes happens that ulceration is present only in the middle or terminal portions of the latter organ. *The caecum* should be examined and particular attention paid to the ileo-caecal valve. Care should be taken not to confuse the small crypts near the base of the ileo-caecal valve with the type of ulceration which is often associated with swine fever.

The mesenteric glands, which form a chain in the colonic mesentery, should be incised and examined for oedematous swelling or marbling due to haemorrhages in their substance.

In the dietetic disease of pigs known as "oedema of the bowel," which is associated with a history of sudden death occasionally preceded by nervous symptoms, frequently the only *post-mortem* finding is a gelatinous infiltration of the folds of *the colonic mesentery*. This condition is present only when the examination is made soon after death. Its presence should therefore be noted during the dissection of the coils of the colon. *The liver* should next be examined by cutting it into sections and its consistency determined by pressing the fingers through the parenchyma. When degenerated, the consistency is found to be friable instead of firm on pressure with the finger and thumb. In acute infections, exudate and degenerated epithelium tend to soften and weaken the interstitial connective tissue at its capsular attachment so that it strips with ease. In passive congestion venous blood is contained in the liver substance and runs from the cut surface. Normally the organ is odourless; when *post-mortem* decomposition is present, this is not the case. *The spleen* in acute infections is sometimes slightly enlarged and engorged with blood-stained fluid which drips from the cut surface.

The external surface of *the kidneys* should be carefully examined for the presence of petechial haemorrhages. The organ should then be severed in half, the cut surface washed, and an attempt made to strip the capsule with the thumb nail. Normally the capsule is loosely attached to the parenchyma. In acute infections it strips with ease due to softening of the interstitial connective tissue at its capsular attachments. The cut surfaces of the organ should then be examined. Normally the cortex of the kidney of large pigs may very faintly show myriads of tiny round red bodies, which are the glomeruli. In hyperaemia and acute inflammation these bodies stand out prominently, the size of pin-heads, all over the cortex, which later may also show alternating red and yellow lines due to hyperaemic blood vessels and degenerated tubular epithelium. The intermediate zone is dark red, due to the greater number of blood vessels. The medulla is swollen, dark red or yellow, translucent, and striated with dark red lines, which are dilated blood vessels. In acute inflammatory processes the pelvis may show slimy turbid mucopurulent material.

In chronic inflammatory processes the cortex may show thick white lines which are composed of increased interstitial connective tissue, or the whole cut surface may be fibrous and white and the capsule white, opaque and pitted with areas which become depressed by contraction of the interstitial connective tissue at points of contact with the capsule. *The bladder* should be incised and its contents and the appearance of its mucosa observed. *The pericardium* should be cut, and the amount and nature of the contents of the pericardial sac noted. *The epicardium* should be examined for the presence of haemorrhages on its surface and the myocardium for evidence of degeneration. *The heart* cavities should then be opened and particular attention paid to any evidence of vegetative endocarditis, which may be due to chronic swine erysipelas. *The pleurae* should be examined for haemorrhages, adhesions, etc. *The lungs* should be palpated for nodules, areas of consolidation, etc. Longitudinal incisions should then be made through the entire thickness of each lung for the presence of foam, indicative of oedema, congestion, haemorrhages, areas of pneumonia, etc. *The lymphatic glands* throughout the carcase should be examined for oedema, or a marbling effect due to haemorrhages.

On completion of the *post-mortem* examination any material which it is desired to send to a laboratory should be transferred to an appropriate wrapping and container, care being taken to avoid any unnecessary contamination of the outside of the container by any infection which may be present. If the diagnosis has been deferred it is advisable to make very careful record of the *post-mortem* findings for personal use later.

B. Procedure in the Event of an Indefinite Diagnosis

There are many problems peculiar to pigs which render diagnosis of their diseases more difficult in the first instance when compared with other farm animals. Briefly, these problems may be attributed to:—

1. Disease in pigs being usually a herd problem rather than one relating to the individual animal.
2. The prevalence of swine fever and the difficulties of its diagnosis, particularly in the early stages of some outbreaks of this disease.
3. The close resemblance of other infectious diseases to swine fever, particularly in their early stages.
4. The importance of resistance-lowering factors associated with environment, which are often of greater diagnostic value and importance than the invading organisms causing the disease.
5. The need for greater research into pig disease problems in general.

There is no need for me to remind you that some outbreaks of swine fever are so atypical in their onset that it is necessary on every occasion when confronted with an indefinite diagnosis to give serious consideration as to whether it is advisable to take action under the Swine Fever Order. When a diagnosis is not straightforward, the whole case must be carefully reviewed in the light of all the available evidence. Frequently it is necessary to await the development of more typical and definite symptoms, and especially more definite *post-mortem* lesions in other pigs of the herd which subsequently die or are slaughtered in the later stages of their illness.

(1) Reconsideration of the Case History

When considering the history of an obscure disease there are certain definite and useful lines along which the enquiry may be conducted.

(*a*) *What is the age and type of pig affected*?—It is usually of significance whether the affected pigs are unweaned ones, stores, fat pigs or breeding stock. Although some diseases affect pigs of all ages, provided of course that opportunities for contagion exist, other diseases are more especially peculiar to pigs of a certain age (*e.g.*, anaemia of unweaned pigs, paratyphoid—particularly in stores—erysipelas, particularly in large store and fat pigs). When pigs of various ages are affected it should also, of course, be borne in mind that the causative factor may be associated with a common method of feeding or management (*e.g.*, starvation, poisoning in the food, etc.).

(*b*) *Are adjacent pens of pigs more particularly affected*?—If so, and provided the construction of the pens facilitates ready contagion, this would suggest that the disease present is contagious as opposed to sporadic. The possibilities of improper environment as the particular factor lowering resistance in adjoining pens, must, however, be constantly borne in mind (*e.g.*, in some piggeries a few adjacent pens may be particularly draughty or wet).

(*c*) *How are the pigs fed*?—Incorrect feeding of pigs is in my experience one of the commonest causes of disease in pigs. Faulty feeding may cause illness from a direct effect of the food itself, or by a resistance-lowering effect whereby invasion of the pig by organisms normally leading a saprophytic existence occurs. In so far as diet is concerned the following information should be obtained:—

1. Are the foodstuffs of the right quantity and of the right type? (Swill is unsuitable for recently weaned pigs.)
2. Has a sudden change been made in the ration? (Pigs are particularly susceptible to sudden changes in the ration and such changes may result in an outbreak of erysipelas, etc.)
3. Are the pigs fed regularly?
4. Does the diet contain anything injurious to the pigs? (Soda and other poisonous foodstuffs.)

5. Are the foodstuffs properly stored and given in the ration correctly prepared ? (Green potatoes, mould, raw potatoes.)

6. Is the ration palatable and acceptable to the pigs ? (Dry feeding of pigs with restricted exercise causes constipation, etc., excessive wet feeding in winter-time causes diarrhoea, paratyphoid, etc.)

7. Does the ration contain the correct amount of water ? (Is the water pure or polluted ?)

8. Does the environment allow an economical use of the ration ?

9. Is there sufficient protein and is the protein of the right type ?

10. Vitamin deficiency may cause unthriftiness, convulsions, lowering of resistance to infection ; vitamin B deficiency in particular may cause necrotic enteritis in recently weaned pigs.

11. Are there sufficient minerals and are they of the right type ? (Copper and iron deficiency may cause anaemia in young pigs and susceptibility to scour ; calcium deficiency may cause slow growth, rickets, agalactia in sows, etc.)

12. If swill is fed, is it boiled ? (Swine fever, and foot-and-mouth disease, digestive derangement.)

(*d*) *What are the hygienic conditions under which the pigs are kept* ?—Like diet, correct hygiene is also of great importance for the maintenance of health in pigs. Hygienic factors likely to cause disease are :—

1. Cold, filthy and wet conditions.
2. Sudden changes of temperature.
3. Dark and damp conditions.

Diseases most frequently associated with bad hygiene are : pneumonia, rickets, rheumatism, swine influenza, cramp, paratyphoid, scours, ascarid infection.

(*e*) *What is the time of year* ?—Certain diseases are seasonable in their occurrence and this knowledge is sometimes helpful in diagnosis. Thus, paratyphoid and rickets are particularly prevalent in winter-time and erysipelas in spring and autumn.

(*f*) *Have there been any sudden changes in temperature* ?—The pig is more susceptible to illness following sudden changes of temperature than any other animal and it is quite common to meet several outbreaks of swine erysipelas following the onset of hot sultry weather.

(*g*) *Is there a likely outside source of infection* ?—An outbreak of swine fever usually depends upon introduction of the virus from an outside source of infection. Thus it follows that the attempted tracing of such a source of infection is frequently a very valuable aid to diagnosis and when the occasion arises an enquiry should be instigated along the following lines :—

1. Have there been any recent movements of pigs on to the premises ? Particular attention should be paid to any breeding movements of sows to an outside boar, or outside sows to a boar on the premises. Similar attention should be paid to any movements of store pigs on to the premises during the past two months, particularly when such movement has been made from a market or dealer's premises.

2. Have any dealers, farmers, fruit-pickers, land workers, German prisoners or other individuals who might have been near other pigs visited the premises lately ?

3. Has the owner or attendants been near any other pigs ?

4. Has the owner any other sick pigs on his other farms ?

5. Is there illness of pigs in the close locality ?

6. Have fresh supplies of food recently been transported on to the premises ? Likely sources of infection in such cases are infected meal-bags, infected swill, and spread of infection by vehicles and their attendants.

(*h*) *Is there a previous history of disease on the premises* ?—A study of the previous history of disease on the premises is sometimes an advantage as there are some diseases which are peculiar to certain farms and localities (erysipelas). Sometimes the susceptibility of pigs on certain farms to disease is due to some faulty condition under which the pigs are reared. (In some pig houses there is a susceptibility to paratyphoid, rickets, pneumonia, etc., in winter-time.) Occasionally the recurrence of disease on a farm is due to the presence of a " carrier."

(*i*) *Have the affected pigs been recently inoculated* ?—In this country, unfortunately, there is no control over the use of vaccines by laymen and swine fever frequently is spread from farm to farm by " quacks." Disease following swine erysipelas immunisation may be due to the introduction of another disease, such as swine fever, at the time of inoculation. At the commencement of an outbreak of swine fever, it has been known for a tentative diagnosis of swine erysipelas to be made and serum treatment prescribed. Apart from the risk of spreading swine fever by insufficient disinfectant precautions, there is a very real risk of infecting the bottle of swine erysipelas serum, so that by the use of that serum at another farm within the next few days, swine fever actually may be introduced. For this reason, when swine fever is prevalent in my practice the maximum size of erysipelas serum bottles we use is 100 c.c. and care is taken to ensure that the remaining serum in any bottle is not used on other pigs for at least three weeks, irrespective of how certain we are of our original diagnosis. Another cause of post-inoculation disease in swine erysipelas immunisation is secondary infection by other organisms such as *S. suipestifer* and *P. suiseptica* resulting from a lowering of resistance to other disease by the use of swine erysipelas vaccine. Finally, post-inoculation disease may be due to the original dose of swine erysipelas serum and vaccine being inadequate to confer immunity to infection by the second dose of vaccine administered.

(2) Reconsideration of *Post-mortem* Findings

To my mind, one of the greatest faults of the teaching in our colleges is the tendency to give the diseases of pigs separate labels and to place them in such individual " water-tight " compartments, in so far as symptoms and *post-mortem* findings are concerned, that the new graduate expects to see a typical case of a particular disease in every investigation he makes. The different disease pictures described, for instance, for swine erysipelas and swine fever are so clear cut in our teaching that in the mind of the student their differential diagnosis becomes merely a matter of referring to a list of symptoms and *post-mortem* findings in a text-book. As a result the new graduate receives a severe shock when he is left alone in the field. Unless he is practising in a district where his existence will depend upon his gaining a practical knowledge of pig disease his confusion will not be improved by experience—and our universal lack of knowledge of some of the less important pig diseases will probably be a final deciding factor in his diverting the whole of his attention to disease control in other fields at the expense of his pig practice. However great may be one's experience, there are outbreaks of disease in pigs which require painstaking consideration of the symptoms and *post-mortem* findings on more than one occasion before a positive diagnosis can be made. For instance, there is no such thing as becoming so experienced in diagnosis that in every case it is possible to differentiate the petechial haemorrhages of swine fever from those of swine erysipelas or the colonic diphtheresis of paratyphoid from swine fever. It is only when these and other *post-mortem* findings are considered in conjunction with all the circumstances of the case that the light gradually will dawn and a positive diagnosis be reached. This will better be understood, perhaps, if we attempt to visualise the pathological processes involved in some pig diseases. We should remember that there are important groups of organisms normally leading a saprophytic existence in the bodies of healthy pigs, particularly members of the salmonella and pasteurella group, and when resistance is lowered one or more groups of those organisms may invade their host and cause disease. Such resistance may be lowered by environmental changes associated with faulty hygiene or improper diet, the disease then being named according to the saprophytic organisms which have thus become pathogenic. Similar infection by those same organisms could occur, however, if resistance is lowered by some group of virulent organisms completely foreign to the host. In this latter case the disease is named according to the type of organism which primarily lowered the pig's resistance. In both these instances, however, the saprophytic organisms may cause identical damage to the host irrespective of whether they were acting in the role of primary or secondary invaders. If we apply this knowledge to the swine fever/swine paratyphoid/swine plague syndrome, it is easy to see the confusion which may arise in interpreting the significance of the lesions due to the saprophytic organisms involved. If during an enquiry it is decided that there are lesions on the intestinal mucosa usually associated with salmonella infection it is necessary to go one step further and decide whether those organisms are acting in a primary or secondary role ; in other words, to decide whether invasion by those organisms has been due to lowering of resistance by faulty diet (paratyphoid) or whether such resistance has been lowered by invasion with the swine fever virus. It is the circumstantial evidence to which I have referred already on which a decision must be made pending the occurrence of more typical and diffuse petechial haemorrhage formation or button ulceration which in themselves are indicative of swine fever. The same complication arises in the acute septicaemias. Thus pasteurella and salmonella organisms may invade if the resistance is lowered by faulty hygiene, etc., and give rise to symptoms and *post-mortem* lesions identical with the type of acute septicaemia which may be caused primarily by the swine fever virus. It is in such a case that circumstantial evidence becomes of great value when one is attempting to arrive at an early diagnosis.

When disease occurs in a herd the resistance shown by individual pigs is not necessarily the same. Whereas in the early stages of an outbreak some pigs may die from acute septicaemia, or toxaemia, the resistance of others in the same herd may be such that the invading organisms have time to attack a particular organ of the host (their predilection site) where damage more typically associated with that disease will occur ; it is then that one can begin to place reliance on *post-mortem* findings alone, provided the significance of lesions which may be due to secondary invaders is borne in mind.

In conclusion, I would also like to emphasise the part which we

practitioners are ready to play in the agricultural plan recently visualised by the Government. It is difficult to understand the apathy with which we are at present regarded by the Government's spokesmen. Mr. Williams recently said that in agriculture there is a great heritage of skill, ingenuity and courage. We veterinary surgeons share that skill and ingenuity notwithstanding the Government's failure to provide us with adequate facilities and money for research. In spite of the meagre incentives we are offered we have the courage to utilise our existing knowledge and skill to the fullest advantage of the livestock industry in this present crisis.

Reply to Discussion *

In reply, Mr. SWANN said that Mr. Emson had agreed with his remarks in the main so that he would deal at once with the points which Mr. Moore, the second opener of the discussion, had raised. The statistics which he had quoted were produced by Mr. P. L. Shanks, of Leeds University, and would in fact be reproduced in the preface to the Pig Diseases Handbook which would shortly be published by the N.V.M.A. He would remind his listeners that these losses were quoted as 20 per cent. by the time of weaning and another 10 per cent. before fattening. These losses, moreover, did not include those incurred from the major infectious diseases such as swine fever and swine erysipelas. He would be interested to hear where Mr. Moore had obtained his figures. The fact that they quoted even greater losses from disease was all the more reason why the profession should contribute some scheme to the pig industry at once in an attempt to reduce them. He was interested to hear the references to the significance of infarcts and haemorrhages of the edges of the spleen in the diagnosis of swine fever. One point to which he had not referred and which no one else had mentioned in the discussion was the importance of numerous haemorrhages in the kidneys, in swine fever diagnosis. In America, this turkey-egg appearance of the kidneys was considered of sufficient significance to confirm the existence of the disease immediately. Mr. Moore had suggested that it was never necessary for him to make more than two enquiries to diagnose swine fever. That was not his experience, nor was it the general experience of the Ministry of Agriculture. Were it so, the fact that V.I.s as well as L.V.I.s sometimes became involved in making six or sometimes seven visits before diagnosis was confirmed would suggest that they were incompetent. He did not believe that to be the case. In practice there was of course often a serious time-lag before the clinician's diagnosis was confirmed by the Ministry. Under such circumstances it became a matter of confidence between the practitioner and his client when a slaughter policy was advised before the disease has been confirmed. Such confidence must be firm if repercussions were to be avoided when, following the removal of all the evidence, confirmation was not forthcoming. This arrangement between practitioner and client saved the pig industry many pounds a year, and in his opinion when serious outbreaks of swine fever occurred, probably 50 per cent. of cases of swine fever were not confirmed, for this very reason. Mr. Moore had referred to poisoning by potatoes. The factor associated with potatoes was the alkaloid solanin. It was particularly in potatoes which were sprouting that the disease occurred. It was associated with sudden deaths often preceded by severe diarrhoea and coma. The *post-mortem* findings were those of acute enteritis. When he had described vitamin B_1 deficiency he was bearing in mind the experiments which had been carried out at Cambridge where it was conclusively shown that vitamin B_1 deficiency was directly connected with necrotic enteritis. For that reason the prescribing of yeast, and the turning out to grass of pigs suffering from this disease, was a very reasonable line of treatment. He did not agree with Mr. Moore when he said that it was not necessary to open the large colon throughout its length in *post-mortem* examination, in that it was rare to find swine fever ulcers in this part of the bowel only. Mr. Moore, however, had suggested that 6 to 7 feet of the bowel should be opened. This was coming over to his line of argument to a degree, in that it was usually accepted that only a very short piece of the first part of the colon should be examined. In the speaker's experience in the severe outbreak of swine fever in breeding sows at the commencement of the war it was not uncommon to find ulcers in the middle and terminal portions of the colon only, and even then only following two or three weeks' illness.

Several speakers had referred to the possible duration of the contamination of swine erysipelas serum by swine fever virus. He had raised this point with different laboratories several years ago and he was assured that two weeks would be the maximum time of survival. For that reason he advised three weeks' delay in using serum which might have been contaminated. He was not a laboratory worker but a practitioner, however, and he felt that this matter was so important that the exact time factor should be found out at once. Mr. Callaghan had suggested that with proper precautions the serum could not become contaminated. The outside of the bottle as well as any container to which it was returned was also an important source of possible infection. Mr. Eaton had raised the matter of differential diagnosis between the foot lesions of foot-and-mouth disease and those changes due to dietetic disease. He would refer this question to Mr. Moore, the Ministry's representative, and at the same time he would also mention those foot lesions due to *F. necrophorus*. Mr. Eaton had also mentioned anthrax. He would remind his listeners that anthrax infection could also involve the mesenteric lymphatic glands. A few years ago Saunders, of Bedford, reported the finding of *B. anthracis* in these glands in several instances. In reply to Mr. Weighton, he would suggest that the "twitching" disease which he had described was Aujeszky's disease. This disease was caused by a virus and was usually fatal. He agreed with Major Hicks that it might also be due to a calcium deficiency. They were all well aware of the result of iron deficiency in young pigs, and the poor quality of foodstuffs at the present time and the tendency to under feed sows when pregnant were very good reasons why calcium deficiency was also likely to have been more common of late. Mr. Weighton had asked him to say a word about swine influenza. True swine influenza was associated with a virus and was spread from pen to pen by droplet infection. It was of particular importance in young pigs and its chief symptoms were a cough, followed by dyspnoea and dullness, etc. The resulting broncho-pneumonia was often fatal and pigs which did recover often had a persistent cough right up to the time of fattening. As a result of the damage done by the virus and associated organisms such animals took a lot of food and a long time to fatten. So far as treatment was concerned, sulphapyridine appeared to be a specific.

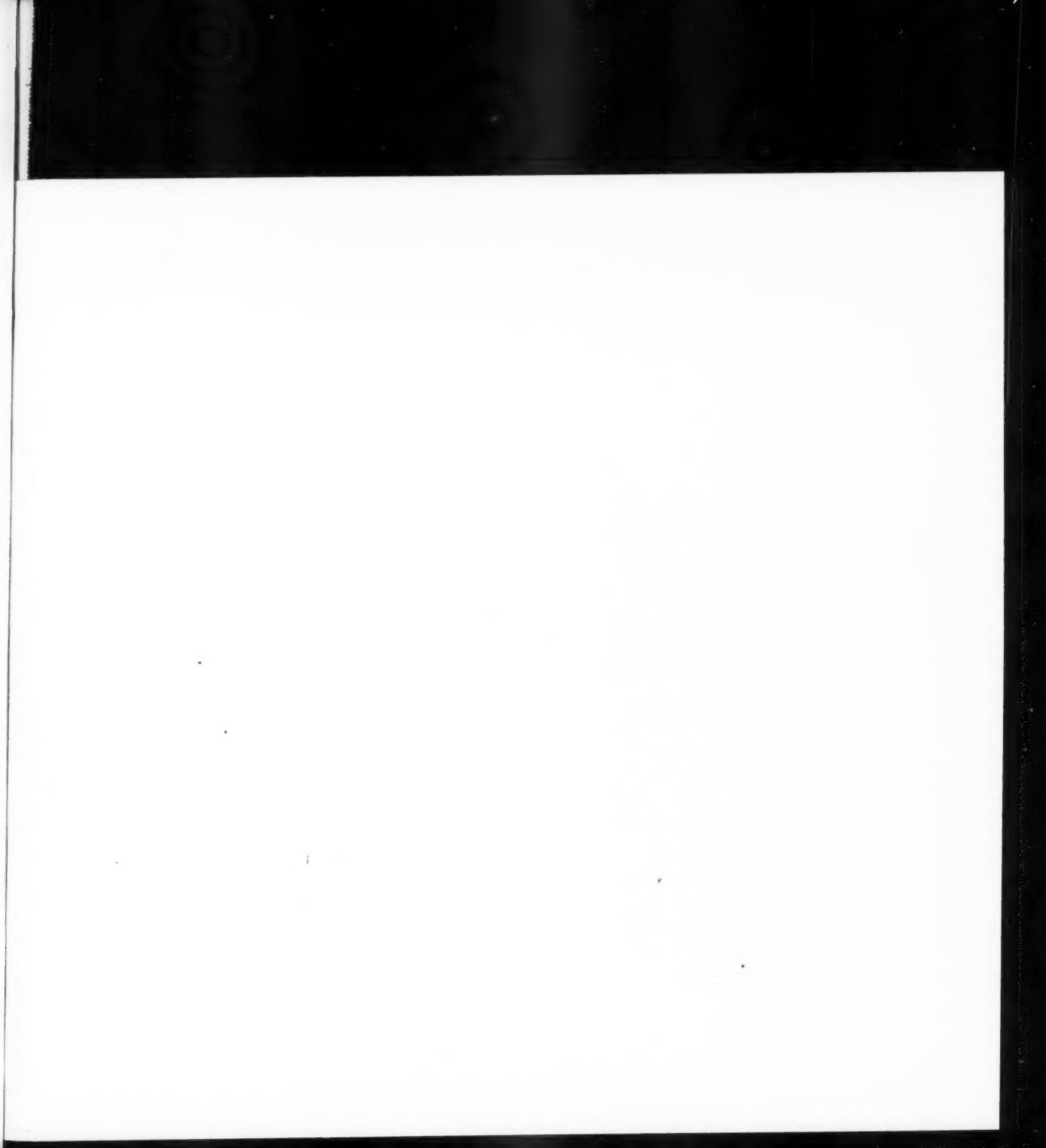
Mr. Noble had asked him to describe his experiences of "oedema of the bowel." This condition was first described by Lamont in Northern Ireland and he was quite sure that it was a common condition in the Eastern Counties. The symptoms were sudden death, often preceded by symptoms of nervous derangement, a staggering gait or a tendency to walk round in circles. There was usually an oedema of the eyelids. *Post-mortem* examination revealed an oedematous thickening of the gastric wall, or a gelatinous infiltration of the colonic mesentery. If *post-mortem* examination had been delayed these lesions would have disappeared and the only findings would be an excessive amount of fluid in the abdominal cavity. He was not sure whether the condition was one of anaphylaxis, but in his experience neither adrenaline or benadryl were of any use in treatment. He was quite certain that there were other similar diseases in recently weaned pigs. Recently he had forwarded material to a laboratory from a similar case and the laboratory had established the existence of an exotoxin which appeared to him of some significance. The causative organism was not established. There appeared to be a whole range of diseases in recently weaned pigs of which we had no knowledge. It was reasonable to assume that Clostridial infections might occur, especially when we thought of similar diseases in other animals. That some of these vague diseases could be caused by penicillin-sensitive organisms was borne out by the immediate response to penicillin therapy in some instances. There was a tremendous field for research in this direction and he hoped that a greater incentive would soon be given to the research worker to carry out more intensive work on pig diseases in general.

* It is regretted that no report of the discussion is available, but the reply indicates the points made by a number of contributors. —*Editor.*

HORSE *v.* TRACTOR

In the February issue of *The Percheron*, official journal of that breed society, Mr. J. A. Stodart, Kingston, North Berwick, examines the relative economy of the horse and the tractor in farming. "On his 450 acre farm," states the *Farming News*, "he has two tractors —a crawler and a row-crop model on rubber wheels—and also a stable of four pairs of horses. The latter are Percherons and we may fan the controversial aspect of his views by stating here and now that he declares that since switching over from Clydesdales and Belgians to Percherons 'my corn consumption has dropped by 50 qrs. a year. With oats worth over 50s. a qr. this year, that is £125 saved.'

"He examines the three main charges—food for the horses and fuel for the tractors; maintenance and depreciation; and labour. The whole comparison is based on the assumption that the average tractor is equivalent to three horses, and that three ploughmen are needed to drive the three teams that compare with the two tractors. Total figures are: £1,041 for six horses and £915 for two tractors, which means £458 for a tractor and £520 for its equivalent in horseflesh—'the difference,' as he says, 'is not gigantic . . . (and he confesses) the horse has got the tractor licked in the harvest field.'"



Gordon C. Knight : SURGICAL REPAIR OF THE RUPTURED DIAPHRAGM

FIG. I

Radiograph before operation showing opacity of left chest up to level of fifth rib. The heart is dislocated to the right side.

FIG. II

Radiograph of the chest five days after operation.

CLINICAL COMMUNICATION

Surgical Repair of the Ruptured Diaphragm

GORDON C. KNIGHT,
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In clinical small-animal practice rupture of the diaphragm is unusual and thus there appear to be few references to the condition in the English literature. The infrequency which may be expected in the condition's occurrence can be judged by only eight confirmed positive diagnoses being made in the five years, 1943–47, when at the Beaumont Animals Hospital, Royal Veterinary College, London, approximately 72,000 small animals (dogs and cats) were seen. Of these eight cases comprising five dogs and three cats, three dogs and the three cats were submitted to operation with the result that two dogs and one cat survived. Two of the three successful operations will be described.

Case No. 1

Subject and History.—A young adult female cat, the owner of which had noticed the animal's unusually quick breathing for the previous twelve hours or so and suggested the possibility of the cat having been run over.

Clinical Examination.—The cat had no obvious skin wounds but a rupture in the abdominal musculature extending anteriorly for about 3·5 cm. from the left inguinal region was palpable. The urinary bladder had passed through the rupture but on pressure was easily returned to the abdominal cavity. The outstanding symptom, however, was dyspnoea. Respirations were deep, laboured and at about 40 per minute, respiratory distress being aggravated by handling the animal. Chest percussion and auscultation allowed no doubt that resonance was reduced and respiratory sounds absent in the left chest. Careful observation of the body's ventral surface showed suppressed respiratory movement of the left side. The animal's temperature was 101·5° F., and the colour of the buccal mucosa normal, but handling or restraint promptly induced cyanosis until a sitting-up position could be voluntarily reassumed.

Diagnosis.—On the clinical symptoms and history a tentative diagnosis of recently ruptured diaphragm was made. No X-ray examination was made as restraint so seriously embarrassed respiration.

Proposed Treatment.—Laparotomy was decided upon with a view to reduction of hernia and repair of the diaphragmatic rupture. Intravenous nembutal, followed by intubated administration of oxygen and carbon dioxide 5 per cent. mixture, was chosen as the means of achieving anaesthesia and ventilating the lungs under the circumstances.

Preparation.—The ventral surface of the body was clipped and shaved, not without some difficulty as the necessary restraint greatly aggravated respiratory distress. This preparation carried out prior to anaesthetisation was thought preferable. The shaved abdomen was swabbed with methylated spirit and the animal then wrapped lightly in a sterile towel.

Anaesthetisation.—Nembutal 1¼ grains in solution was injected by routine technique into the right radial vein. As anaesthesia advanced respiration became more laboured with the onset of cyanosis and the necessity for intubation became evident. A metal catheter (outside diameter 7 mm.) connected to the cylinder of O_2 plus CO_2 was passed into the trachea for about 4 cm. and the gas mixture allowed to enter. Respiration very quickly became composed to about 10 per minute and the tongue returned to a normal colour. No useful estimate of volume of gas mixture entering the trachea in a given time can be made; however, the gas was bubbling briskly through water contained in a glass bottle interposed between the gas cylinder and tracheal catheter. As improvement in respiration was maintained and the mucosae of good colour, after a few minutes it was judged safe to proceed with laparotomy.

Operation.—The animal was turned into the dorsal position and the limbs were loosely fixed in extension. After a final application of spirit to the skin a cm.-long left paramedian incision was made posteriorly from a point adjoining the xiphoid cartilage. On opening the peritoneal cavity, a short paroxysm of coughing violently ejected some abdominal viscera through the laparotomy wound. Examination of the diaphragm showed a rupture which began at the xiphoid and continued through the left costal portion well into the lumbar portion. The rupture was mainly peripheral and left at the most a 4-mm. margin of the costal and lumbar border. Most of the left lateral lobe of the liver, the stomach and some 30 cm. of small intestine had passed through the rupture into the left chest. No adhesions were evident and without difficulty these viscera were withdrawn. The edges of the diaphragmatic rupture were then approximated in three places by the application of light tissue forceps while about eight interrupted sutures of No. 2/o catgut (20-day) were used to make closure permanent. Finally, a strip of omentum about 10 cm. × 2 cm. was resected, spread and tacked over the area with eight interrupted No. 3/o day catgut (20-day). At this stage respirations were deep and about 19 per minute. Slight ballooning of the omental graft with each inspiration pointed to a persistent pneumothorax in spite of apparently progressive inflation of the left lung during the suturing of the diaphragm. The laparotomy wound was closed with catgut and finally the skin with nylon. Sterile sulphathiazole had been lightly insufflated on to the diaphragm, abdominal viscera and laparotomy wound borders occasionally during the course of the operation. An attempt to reduce pneumothorax was made by paracentesis and suction with a 20 c.c. hypodermic syringe. The tracheal catheter was withdrawn but as some slight dyspnoea and cyanosis reappeared the catheter was replaced. After a further 10 minutes of O_2 and CO_2 administration the catheter was again withdrawn and respiration continued satisfactorily.

After-treatment and Result.—For two days the cat remained quite recumbent, respirations averaging between 25 and 30 per minute. Less than 24 hours after operation a little water was taken voluntarily, and by the third day small quantities of both liquid and semi-solid food were accepted. Respirations although deep had then settled to little above normal rate and after five days recovery appeared complete. Skin sutures were removed seven days after operation, the laparotomy wound having healed by first intention. Intramuscular injections of 10,000 units penicillin Ca salt in aqueous solution had been given approximately four hourly for the first two days after operation. The ventral rupture of the abdominal musculature, which was so evident on first examination of the animal, had healed spontaneously, as no hernia recurred after first reduction. The cat is known to have survived the operation for at least one year when the owner reported it to be in apparently normal health and having produced one litter.

Case No. 2

Subject and History.—A short-coated mongrel dog of the terrier type, aged two years and weighing about 30 lb., in good bodily condition. The animal was admitted and, according to the owner, it had been run over a few hours previously, since when breathing appeared unusual.

Clinical Examination.—The animal was badly bruised in the posterior abdominal skin and had a few abrasions on the limbs. Respirations were deep and about 30 to 35 per minute. Very marked loss of resonance throughout the left chest was evident on percussion but membranes were of good colour. It was decided to keep the animal under observation and in about 16 hours the condition had slightly improved in that dyspnoea was less marked, but the left chest remained dull. There was disinclination to assume any position other than the sitting one; holding the dog up by its hind limbs did not appreciably aggravate respiratory symptoms. In the circumstances a diagnosis of ruptured diaphragm seemed the most probable. As this was supported by X-ray examination (Fig. 1) exploratory laparotomy by the method employed in Subject No. 1 was decided on.

Preparation.—The ventral surface of the body was prepared for operation in the ordinary way by clipping and shaving but little or no aggravation of dyspnoea resulted from restraint in the dorsal position.

Anaesthesia.—Nembutal 6 grains in solution was given by the routine intravenous technique and anaesthesia induced normally, little less than an average dose for weight being required. No respiratory crisis quickly developed with the result that ventilation of lungs, although expected to be required emergently, was in fact adopted before tongue cyanosis became very evident. In this case a slightly curved glass cannula of 8 mm. outside diameter and 10 cm. long was used and the O_2 plus 5 per cent. CO_2 mixture administered roughly at the same rate as in the previously described operation.

Operation.—A 16 cm. left paramedian incision was made into the abdominal cavity and the wound edges were retracted. About two-thirds of the liver, stomach, spleen and most of the small bowel had passed into the left chest through a diaphragmatic rupture. These viscera were withdrawn without difficulty into the abdominal cavity leaving in view an inverted V-shaped tear in the muscular portion of the diaphragm, roughly 7 cm. in full length. Swabs were packed into the abdominal cavity to absorb haemorrhage from the liver and three pairs of light tissue forceps were used to close the diaphragm rupture until traction sutures were put in. The rupture was finally closed with about ten simple interrupted No. 2/o gut sutures (20-day) but, before the last was tied, pneumothorax was reduced to the minimum, an assistant applying pressure to the trachea around the cannula thus producing lung inflation. No omental graft over the diaphragm wound was employed and the laparotomy wound was closed with gut and nylon for the skin. From time to time, throughout the operation, powder made up of penicillin Ca salt 5,000 units to 1 gramme sterile sulphathiazole was very lightly insufflated on to peritoneal surfaces. A critical respiratory phase

arose when the O_2 and CO_2 supply unexpectedly exhausted, but fortunately the change over to another cylinder was completed in time. During the operation, which occupied about one hour, intubation ventilation was continuous but varied according to the character of respiration and the colour of mucosae. On completion of the operation the glass cannula was withdrawn and not replaced, as no respiratory failure or distress threatened.

After-treatment and Result.—Respirations varied between 36 and 28 per minute for four days and on the fifth day after operation were normal. Surgical shock was considerable and for 48 hours after operation the dog was very weak, making no attempt to stand and with a slightly subnormal temperature. Room temperature, however, was maintained at about 65° F. and the animal kept as warm as practicable with hot water bottles and blankets. An initial post-operative dose of penicillin (ethyl oleate emulsion) 250,000 units was given intramuscularly and followed by a half of this dose every twelve hours for three days. The laparotomy wound healed by first intention and the animal was discharged eight days after admission. Fig. 2 is a radiograph taken six days after operation.

Discussion

The operations have shown that at least in some cases, nembutal anaesthesia together with intubated oxygen plus 5 per cent. carbon dioxide or oxygen alone allows surgical repair of ruptured diaphragm by the abdominal approach.

The use of nembutal or a similar anaesthetic intravenously in such a condition clearly requires that the animal's respiration should be very carefully observed in order that passage of the tracheal tube may be made at the right time. The depth of anaesthesia necessary to permit easy intubation in the case of ruptured diaphragm may bring the animal close to asphyxia; thus there must be little delay in passing the tube when it becomes necessary. This stage is no doubt dangerous but with all requirements to hand and good illumination of the pharynx, the prompt intratracheal delivery of oxygen in sufficient volume will avert mishap and maintain adequate ventilation of the lungs.

To carry out the operation at least two assistants, one attending to the animal's oxygen requirement and another as a surgical assistant, are necessary. Planning the procedure to be followed and making sure that a good light is on the operation site and every instrument likely to be required is available, will be well worth while.

The topical and parenteral use of penicillin and a sulpha compound provides a good safeguard against post-operative sepsis which, in spite of every possible aseptic precaution, must ordinarily be regarded as an important risk of any prolonged pleural exposure.

In view of the clinical report from Brook and Holmes (1929) (*Vet. Rec.* **9.** (N.S.) 814) it is interesting to record that seven of the eight cases referred to in the introduction were left side ruptures and the remaining one a right side rupture.

In conclusion, the writer most gratefully acknowledges the essential and invaluable help given directly and indirectly by his colleagues at the operations described. In particular, the assistance of the late Miss Elizabeth Barber and Mr. J. E. Gray in Case No. 1 and of Mr. A. Lawn and Miss Barbara Schofield in Case No. 2. The writer also wishes to thank Mr. Lawn for providing Case No. 2 and Mr. Peter Kiddle and the College Librarian, Mr. B. Taylor, for help with references.

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Weekly Wisdom

The price of human salvation is eternal vigilance, incessant fearless criticism and unrestricted wit.—H. G. Wells, "The Fate of Homo Sapiens."

* * * * *

According to a newspaper report, a learned judge, castigating a witness, said lately that in his long experience he had found that anyone who did not look him straight in the face when giving evidence (as in this instance) was shifty, untruthful, and untrustworthy. In my personal view, and that of a few of my colleagues and friends, reluctance to look one's hearer in the face is generally due either to inherent shyness or to a visual defect, such as squint, giving rise to a natural if unconscious desire to hide one's physical disabilities from one's neighbour. A swindler or other professional liar will, if he takes his job really seriously, train himself from the beginning to look his audience (or victim) straight in the eyes.—A *Lancet* "Peripatetic Correspondent."

ABSTRACTS

[Union of Fractured Femur by means of Centro-medullary Metallic Pinning. (Free trans. title.) Marcenac, N., Bordet, R. J., & Jenny. (1947.) *Bull. Acad. vét. Fr.* **20**. 61-68.]

The practice of immobilising fractures by metal pins, wires, bands, screws, etc., is well established in veterinary surgery in Germany, Switzerland and to a lesser degree in France. The technique, though delicate, is not difficult, provided certain rules are rigidly observed. Unfortunately, rings (Lambotte) and metal splinting (Shermann & Fredet) often fail to achieve the degree of immobility essential to the repair of fractures, nor are they of great value when treatment presents the complications of late intervention, such as old callus, retraction, overlapping or gross periosteal reaction. Consequently, many fractures are abandoned which might otherwise have been reduced.

The introduction of metallic pins (Smith-Petersen, Kirchner, and later Kuntscher) into the skeletal system is the subject of this paper. The method is applicable to fractures of the tibia and radius besides those of the femur, to which the technique described later is devoted. Its use is practicable in all shafted bones provided the fracture occurs centrally or nearly so. It is definitely contraindicated in fractures involving the upper or lower third. The instruments required are those for skin and muscular section and haemostasis, together with compress dressings, heavy bone forceps (Farabeuf & Lambotte), a mallet, bone drill and saw. Of the two pins in common use, Kuntscher's is V shaped in cross-section, while that of Rocher is circular. Both have a slightly pointed end for impaction into the epiphysis and an eyeletted head for gripping and subsequent withdrawal. All instruments and the pin are rigidly sterile; the latter must be completely inoxydisable. As a pre-operative precaution, the limb (of the dog) is radiographed at 70 cm. to establish the exact dimensions of the medullary canal.

The ideal procedure is a direct transcutaneous fixation through an incision over the trochanteric region, allowing the pin to be passed straight down the medullary canal and to secure the fractured ends in apposition while the limb is held in forward extension, but since this technique demands the aid of the radioscopic screen, a visual technique is described.

Under general anaesthesia and rigorous asepsis (human surgery postulates three distinct aseptic preparations), an incision is made in the external face of the thigh passing through all layers and exposing the major length of the femur. The fractured edges are thoroughly cleaned. A second incision is made anterior to the trochanteric ridge, exposing the underlying fossa, which is drilled without difficulty. The rod is introduced and tapped down the long axis of the shaft, bringing the fractured ends into accurate apposition. Increased resistance to tapping indicates that the pointed end has entered the distal epiphysis. Firm fixation is an essential part of the technique and shortening as a result of the removal of sequestra or any tendency to rotation of the shaft around the pin are countered by one or more metal circlets gripping the periosteum. The incision is closed layer by layer; plentiful dressings are applied and strapped into place. A light window type cast may be applied at discretion.

Prognosis is good if interference is not delayed, and in the absence of concurrent infection, cicatrisation being generally complete by the eighth to tenth day. From the start the subject is able to use the member and the resultant callus is often impalpable. Complete function is restored. Opinion varies as to the desirability of leaving the pin in place longer than three months, but provided the metal is inoxydisable, no harm appears to result by not removing it.

One case record and four radiographs are given.

J. P.

* * * * *

[An Experiment on the Relationship of Diet to Hookworm Disease in Lambs. Lucker, J. T., & Neumayer, E. M. (1947.) *Amer. J. vet. Res.* **8**. 400.]

As a result of their earlier work (Lucker, J. T. & Neumayer, E. M., (1946.) *Amer. J. vet. Res.* **7**. 101) the authors concluded that good diet may enable lambs to cope successfully with heavy infestations with *Bunostomum trigonocephalum*. In this paper they briefly discuss other work on this subject, quote literature which reports that the diet of the host is an important factor in human hookworm infections also and report the results of a further small-scale experiment of their own, done at Beltsville, Maryland, on the influence of diet upon infections of lambs with *B. trigonocephalum*.

The authors used eight recently weaned lambs, two to two and a half months old, classified in pairs by similarity of age and weight. Two of these pairs were given a good diet of alfalfa hay, yellow corn and bran; two other pairs were given a poor diet of timothy and light clover hay. In each of these two groups of four lambs, one pair was a non-infected control pair. The other pairs were infected, one lamb of each pair being exposed to infection through the skin by 50,450 infective larvae of *B. trigonocephalum* given over a period of

seven days, the other lamb of each pair being exposed to infection by 139,300 infective larvae given over a period of 38 days. The methods of examining the blood and of the faeces for occult blood were the same as those described in the authors' earlier paper (loc. cit. above).

The faeces of the infected lambs of the poor-diet group showed occult blood on the 18th day after infection, but had been negative on the 15th day, so that loss of blood by this route began between the 15th and the 18th days after infection. From the faeces of the infected lambs of the good-diet group weakly positive benzidine tests were often obtained, because benzidine does not distinguish between haemoglobin and the abundant chlorophyll in the diet of this group, so that the first appearance of occult blood in the faeces of these lambs could not be determined accurately; but the first intensely positive reaction occurred on the 22nd day after infection.

Both infected lambs of the poor-diet group developed extreme anaemia and died. The one given 50,450 infective larvae died 50 days after infection and yielded 4,641 hookworms; the other given 139,300 infective larvae, died 80 days after infection and yielded 1,663 hookworms. The anaemia of the former lamb developed more rapidly than that of the latter. The uninfected control pair of lambs of this group did not develop anaemia.

The infected pair of lambs of the good-diet group also developed anaemia, but this was only moderate. They both survived, and about seven months after infection their red cell values had become nearly normal. The lamb of this pair given 50,450 infective larvae yielded 1,331 hookworms and the one given 139,300 infective larvae 612 hookworms. The former of this pair also developed anaemia more rapidly than the latter. The uninfected control pair in this good-diet group also did not develop anaemia.

The authors discuss the nature of the anaemia and state that it was "essentially normocytic, irrespective of diet or fatal or non-fatal course, and, except perhaps terminally in fatal infections, normochronic, so far as Wintrobe's constants revealed." Individual red cells were not, however, normal.

The results show that the lamb in each group which received the smaller number of infective larvae, the fewer administrations of these, the larger initial application of them to the skin, and the greater number during the first week of the experiment was the one more severely affected. The authors conclude, for reasons given in the paper, that, although differences in exposure to infection affected the intensity and speed of development of the anaemia, diet was the determinant of the differing severity of the disease. It affected both the susceptibility to infection and also the ability of the host to compensate for blood loss. The poor diet was, in comparison to the good one, deficient in protein, iron, calcium and certain vitamins.

The lambs also carried infections with coccidia (species of *Eimeria*) and *Strongyloides*, but the authors concluded that the effective pathogen was *B. trigonocephalum*. Important practical points discussed are: (1) After equal exposure to the infective larvae, the lambs on the poor diet lost weight, while those on the good diet gained weight; (2) the lamb on the good diet and given the smaller number of infective larvae developed the more intense anaemia and had higher faecal egg counts than the one given the larger number of larvae; and the same inverse relationship between the number of larvae received and the egg counts and the anaemia would probably have been the same in the two infected lambs of the poor-diet group, if the death of one of these lambs had not prevented the necessary examinations.

The terminal symptoms of the disease were lethargy, failure to respond to stimuli and failure to eat. When made to rise, the lamb stumbles; finally it cannot rise. Coma precedes death. The authors ascribe death to the anaemia rather than to a hookworm toxin.

G. L.

WORLD'S POULTRY CONGRESS

The eighth World's Poultry Congress is to be held at Copenhagen from August 20th to 27th. These congresses, which are held every three years, are promoted for the exchange of international information on research, economic and practical developments in the industry by the presentation of papers.

This year's congress will be divided into five sections which will deal with the following subjects: Genetics and incubation, nutrition, physiology and rearing, investigations of diseases and their control, education and organisation, including reconstruction after the war; economic problems, including marketing. Twenty-six papers have been sent from this country and will be submitted by prominent British scientists and practical poultry farmers. Full particulars regarding membership and transport and accommodation for the Congress can be obtained from the British Secretary, Major Ian MacDougall, 45, Bedford Square, London, W.C.1.

REVIEW

[**The Right Way to Pig Keeping and Breeding.** By Alan Morley. pp. 109+viii. Right Way Books: Andrew George Elliot, Glade House, Kingswood, Surrey, and The Rolls House Publishing Co., Ltd., 2, Breams Buildings, London, E.C.4. Price 5s.]

This excellent work makes a welcome addition to the literature on pig-keeping. Written in a very readable style the contents are, with one or two exceptions, technically correct and are put over in such a way as to make it obvious that the author has practical experience of the matters with which he is dealing.

The book covers the better known breeds of pig (illustrated by photographs), housing, feeding and all forms of management of breeding and feeding stock. The material and advice in these chapters is first class and it is therefore regrettable that criticism must be levelled at the section dealing with castration of young pigs and that on disease. The suggested age for and method of castration will not meet with the approval of all veterinary surgeons, but this is a minor matter compared with the omission of so important a disease as swine erysipelas from the chapter on diseases of pigs; in addition the description of foot-and-mouth disease lays too much stress on the occurrence of mouth symptoms and too little on the constant presence of foot lesions and lameness.

None the less the book can be highly recommended as a text-book for students, as a reference for the town practitioner having to deal with pig clubs in times of emergency and in particular it could with advantage be in the possession of the executive of all co-operative pig clubs and every small pig keeper.

TRIVIA

Controversy over the de-horning of cattle continues to rage. Some people lament that without her horns, all the beauty of an Ayrshire would be gone. Much the same argument, we imagine, was once made about full-rigged ships, but it did not prevent the advent of the steamer. Farmers point out the irascibility of certain cows, and the damage they inflict upon their neighbours. "A cow without horns," declared one enthusiast, "can give all its attention to milk production." We had always wondered what cows thought about as they chewed the cud: was it, after all, only commerce? Then there is the argument that hornless cows need less space. Is this quite fair? We travel by Tube, and we know what it is to be jammed together just because we have no horns. Finally, one point seems to have been overlooked. What about the cow's subconscious? Will it be found, some time during the next century, that a veterinary psychiatrist attributes a declining milk yield to some frustration complex on the part of the dehorned Ayrshire?

. . . . .

In recent months, there has been a wave of thefts from parked motor cars in Dublin. At least one of these car thieves has learnt a lesson (writes "Quidnunc" in *The Irish Times*).

Recently, a Dublin veterinary surgeon was treating a dog owned by an old woman. One morning when he called to see the dog, he found that it had died during the night. The woman, who was living in a small flat, was very worried because she had no garden in which to bury the animal, and eventually the vet. agreed to take it away with him, and have it buried in his kennels. Because he had to make a few calls around town, he borrowed some brown paper and parcelled up the dead dog.

On his way back to the kennels, he parked the car and made his calls. When he returned to the car, after some 20 minutes, he found that the lock had been forced and the parcel stolen.

. . . . .

I read that foster mothers are paid 12s. 6d. a week. This is 2s. 6d. less than I have paid to board my dog out for the same period.—*Evening Standard*. (I. S. Jacobs.)

* * * * *

A large collection of wild animals, birds, and reptiles for the London Zoo arrived at Liverpool recently from Africa. Mr. G. S. Camsdale, who has left the Colonial Forestry Service to become assistant superintendent at the Zoo, was in charge of the collection, which included three chimpanzees, 12 monkeys, 77 rare birds, two crocodiles, giant 14 lb. rats, and 20 snakes, including several pythons about 13 ft. long. A special railway van, heated to tropical temperature, was used to transport the animals from Liverpool to London.

MEMOIR

Hugh Begg, Sen., F.R.C.V.S.

With the passing of Mr. Hugh Begg the profession has again lost one of its outstanding members, and while no doubt we have all our role to play few are privileged to take part in pioneer work as he did. Not only that, he was, as so often happens in such cases, imbued with a force of character and breadth of vision which made him particularly suitable for such work.

Born at East Kilbride, Lanarkshire, in 1867, Hugh Begg was the eldest of a family of 13. Like many others who became prominent in later life he was brought up in an atmosphere of hard work and strict observance to duty peculiar to that period. His father was the village blacksmith, and at the early age of 14 Hugh left school, and began work in the smithy. Then, as now, East Kilbride was in the centre of an intensive dairying district, and this fact, coupled with his experience in the 'smiddy,' to which he so often referred with a sense almost of affection and pride, must have had a very distinct influence in moulding him for his life's work.

[*Photo: Lafayette Ltd., 53, West Regent Street, Glasgow, C.2*

In October, 1884, he entered the Glasgow Veterinary College, and qualified three years later when barely 20 years of age. In spite of a lack of education as judged by present day standards, except perhaps in the school of hard manual work, it was typical of the man that he gained medals in his final year for both medicine and surgery. After qualifying he was retained on the College staff and acted as house surgeon and assistant under Principal McCall.

In 1888 he returned to his native village and set up practice on his own account. There he remained for a period of 22 years during which he built up a large country practice specialising, perhaps quite unconsciously, in diseases of cattle. In this direction his powers of observation were very acute, and what is still more important in a veterinary surgeon, he had the happy knack of correctly interpreting the significance of what he saw. As an example of his attention to detail his observations on such a common process as chewing the cud come to mind.

It has been said that there is a tide in the affairs of men which, taken at the flood, leads on to fortune, and the current must be taken when it serves or lose our venture. As far as Mr. Begg was concerned he took this step in 1910. At that time Lanarkshire County Council decided to appoint a whole-time County and District veterinary inspector, and out of a large number of applicants Mr. Begg was appointed, thus becoming the first whole-time veterinary inspector in Great Britain. This appointment entailed his removal to Hamilton where he remained for the rest of his life. He now entered on that part of his career which was to give full scope for his initiative backed by an eminently suitable background of experience, and over a period of years he built up an efficient and well organised veterinary service in the county. As a result it is true to say that the example set by Lanarkshire was copied by many local authorities. He was quick to realise the part which the profession could play in what was then a comparatively new field of activity, and it was indeed fortunate that this venture was under his control.

In his new sphere tuberculosis in dairy cows was Mr. Begg's principal interest, and it was primarily as a result of his propaganda, initiative, and far sightedness that the first few tubercle-free herds in the county were established, and the position which Lanarkshire enjoys to-day in that connection is due in no small measure to the foundations laid by him. In addition there must be many veterinary surgeons who have benefited from his experience of this one disease and thereby avoided many of the pitfalls.

While county veterinary inspector for Lanarkshire his services as a public speaker were much sought after wherever the question of tuberculosis in cattle, milk hygiene, or building construction was to be discussed. Such services were freely given and it is a great reflection of his capabilities that many of the principles which he propounded and which were gained as a result of his own experience have stood the test of time and are still true to-day.

In 1935 he retired from the position of county veterinary inspector, and even at the ripe age of 68 took a refresher course in parasitology at Liverpool University, later becoming professor in this subject at Glasgow Veterinary College, a post which was the last he held.

Apart from his many activities in an official capacity his energy and versatility found expression in many other directions. While engaged in practice he found time to be a member of the then School Board and later was chairman of the Parish Council. When in the employment of Lanarkshire County Council he took a keen interest in the affairs of the National Association of Local Government Officers and was chairman of the Lanarkshire Branch for a period of 23 years. For a time he was also chairman of the Scottish District Council of that Association and also acted as the representative for the South and West of Scotland on the National Executive Council. He was also interested in the affairs of the Royal Sanitary Association of Scotland, and was the President in 1932. He also acted as examiner in meat inspection for that association over a period of many years.

He was associated with the Glasgow Veterinary College for the best part of his life and, apart from the remarkable coincidence that he began and ended his long career there, he was a member of the Board of Governors from the inception of that body in 1906 until 1935 when he again joined the staff.

He also acted as examiner in materia medica for the R.C.V.S. for a period of 17 years. Other veterinary activities included writing certain articles for Hoare's Veterinary Medicine and also the Veterinary Encyclopædia and those who knew Mr. Begg and have read these articles will readily recognise his stamp.

Mr. Begg had many other interests. He was always a keen bowler and was repeatedly champion of his club and on two occasions played in rink finals for Scotland. Like many other Scots he was a Burns enthusiast and was a member of the Hamilton Burns Club for over 20 years, being at one time president. Music also attracted his attention and while at East Kilbride he was president of the local association for nine years.

His sudden death terminated a long and full life, and those who were privileged to be associated with him will long remember his sound advice which was always freely given. He had a breadth of vision such as few possess, and on the public platform he excelled. He had the gift not only of knowing exactly what he had to say but of clothing it in language as few can. He had his niche to fill and he found his correct one, and whatever shape whole-time veterinary service may take in the future his name will always be associated with the foundation of that part of it which was in the hands of local authorities.

J. W.

An Appreciation

Professor George Dykes, of the Glasgow Veterinary College, writes: I can but hope to write an appreciation of Professor Hugh Begg, not venturing to assess the great value of his work. To my mind, such a tribute should not only voice our thanks, but point to the foot-prints in the sand of time so that others might better understand the way of a man, and also reveal the spirit of a man whose wisdom, work and writings shall stand for all time monumental to his life, his labours and his learning.

Many men, in many countries, are familiar with his learning, but, in the natural course of events, only those of us who have been privileged to come under the direct inspiring influence of Hugh Begg can know the great depth of his love and the full strength of his loyalty. No man can say that he ever knew Hugh Begg to be disloyal to anything he believed to be true or just, or that in defending a right or rebuking a wrong, he ever spared friend or foe.

As an appreciation, I can think of nothing known to me which so clearly reveals the greatness of heart of Hugh Begg than a story I know so well—and let it be said for him that he never once referred to his part in it.

Twenty-three years ago, Mr. Hugh Begg, then C.V.O., Lanarkshire, regardless of possible personal consequences, approached a recently qualified veterinary surgeon, one who had the most negative recommendations for the appointment of additional and temporary veterinary inspector. Few indeed were the questions the C.V.O. asked this disabled ex-Serviceman, who had sought in vain for some form of employment which would give but a chance to live. Furthermore, Begg must have known that a most unfavourable and recent history of hospitalisation reposed in the files of the M.O.H. Lanarkshire, and yet, setting aside his own personal security which could have been assailed by employing one possessed of such a medical history for the work intended, he extended his strong kindly hand to a stranger, to raise him up, to restore confidence, to point to the horizon of hope, to give of his own strength, and to set him upon his way.

I find it very hard to find words to thank him for this beginning, and for the unremitting help and guidance he has at all times given me ever since. He was always tolerant of the impetuousness of youth which he loved and for which he laboured until the end. We may fittingly borrow the lines which the poet sought to portray his thanks to our fathers, as a noble tribute to his memory.

> "Thanks, thanks to thee, thou worthy Master
> For the lessons thou hast taught,
> Thus at the flaming forge of life
> Our fortunes must be wrought."

. . . . .

A Farming Tribute

In a tribute to Mr. Begg published in its issue of March 20th, *The Scottish Farmer* observes: "It would not be true to say that Mr. Begg endeared himself to the dairy farmers or to the landlords of the county under his charge. He set for them an exceedingly high standard and it is not too much to say that under his regime Lanarkshire was possibly further ahead in dairy hygiene than any other county in Great Britain. In every respect he was in front of the times and did his best to keep Lanarkshire in the forefront. Those who were affected by his passion for progress did not realise that whilst his decisions were sometimes irksome he was acting for the general well-being of the industry and they appreciated that he was working in their interests. He did not have an easy row to hoe, but he did his job and he did it well and there is no question at all that towards the end of his public career he enjoyed the confidence of the agricultural community in a degree which was unique."

GRANTS TO HEAVY HORSE SOCIETIES

Societies travelling heavy stallions under the Ministry of Agriculture and Fisheries Livestock Improvement Scheme have in the past received a direct grant of £40 towards the cost of hiring a suitable stallion, provided not less than 60 mares were served in a season. Where the number of services was less than 60 the grant was limited to £30. The Ministry now announces that for the 1948 season and until further notice the additional £10 will be payable if 40 or more services are obtained.

* * * * *

The average working life of the milk-recorded cow, as calculated from studies of the six main dairy breeds of the country by the Milk Marketing Board's Bureau of Records is 3·1 calvings; only 7·2 per cent. of our milk recorded cows reach the most productive period of their lives, the seventh lactation.

IN PARLIAMENT

Slaughtering of Animals: Debate in the Lords

In the House of Lords on March 18th, Lord Dowding introduced a motion asking the Government that they should (*a*) forthwith extend to other domestic animals the provisions applicable to cattle and calves in licensed slaughter-houses, (*b*) forthwith prohibit the slaughter by knife of domestic animals in full consciousness, in any circumstances, and (*c*) at the first opportunity legislate for the improvement of existing slaughter-houses, both in design and in capacity, so as to obviate all cruelty in the process of slaughter.

Lord Dowding said that, for convenience, he had divided his subject into three parts. The first part dealt with the killing of animals in licensed slaughter-houses; the second part aimed mainly at practices obtaining outside licensed slaughter-houses, and the third part dealt with the adequacy both in capacity and design of the slaughter-houses themselves.

In the Slaughter of Animals Act, 1933, provision was made that the humane killer, or some mechanically operated appliance, should be used on all cattle and calves killed in licensed slaughter-houses; further, that a mechanical or electric stunner must be used on all pigs killed in bacon factories or slaughter-houses where electric power was available. But that was all; there was no statutory protection for sheep and lambs, and only partial protection for pigs. It would be noticed that there was no provision that the mechanical stunner must be used in those slaughter-houses where electric power was not available. In addition, every local authority had to decide within one year whether they would pass a resolution bringing sheep and lambs under the protection which was afforded to other animals.

The present position in England and Wales was as follows. There were 1,440 local authorities, and of those 1,198, or about 85 per cent., had voluntary accorded to sheep and lambs the protection afforded to other animals. Of the remaining 242 authorities, 31 had refused to give that protection to sheep and lambs, and the remaining 211 authorities did not include in their areas slaughter-houses which were active to-day. Before the war there were 17,600 slaughter-houses, and that number had now been reduced to 600; so it was not impossible that some slaughter-houses might be re-opened in the territories of the 211 authorities which had none at present under their jurisdiction. Therefore, his first question was whether the Government would make this protection statutory instead of leaving the question—which was one for the national conscience—to the chances of debate in the councils of local authorities. The protection afforded by the Slaughter of Animals Act, 1933, was only partial, and animals killed outside slaughter-houses received no protection whatsoever.

This brought him to the second part of his question. Before the war, owing to the plentiful provision of slaughter-houses and the small number of amateur stock raisers, the number of animals killed outside slaughter-houses was reduced to a very small proportion of the total. But now the situation was very different. There had been a great increase in the number of pigs privately raised. He had found it difficult to get exact figures, but he thought he would not be far out if he said that in a year the number of pigs slaughtered outside licensed slaughter-houses was somewhere between 400,000 and 500,000. A large proportion of those poor animals, together with uncounted sheep and lambs, were killed with the knife, in full consciousness. The mental and physical agony of these poor creatures was all absolutely unnecessary. It could be stopped by a stroke of the pen. It was necessary only to legislate for the use of the humane killer in all cases. The objections which had been raised to the use of the mechanical killer were as follows. First, it had been suggested that the weapon was dangerous. Secondly, it had been claimed that the carcases of animals killed with it were imperfectly drained of blood, with the result that the meat was inferior both in appearance and keeping qualities. A third objection was made on the ground that the cost of slaughter was materially increased. Taking the first objection, that of danger, he said there was none. The pistol merely fired a captive bolt. As regards the argument about the blood content, he maintained that it was altogether fallacious. He could produce a great volume of evidence, if that were necessary, but he would quote only a few samples of the kind of testimony which was available. A test was made in the Birmingham slaughter-house in the presence of the chief veterinary officer, and, as a result of that test, the blood content, surprisingly enough, came out in favour of the humane killer. The figures were 2·5 per cent. of residual blood, as against 2·8 per cent.

The late Colonel Dunlop Young, an acknowledged authority on meat inspection, who was for many years chief official at Smithfield under the Corporation of the City of London, gave

his opinion after examining the carcases of 1,255 animals stunned with the humane killer at Islington. He said:

"We have carefully examined the meat of the above animals in carcase form and we desire to state emphatically that no exception can be taken to the efficiency of the bleeding—the meat was sold at Smithfield, and no complaints were made or received. We are even of the opinion that it would have been impracticable to have selected otherwise than by chance the carcases of those animals slaughtered after preliminary unconsciousness had been effected by mechanical means."

If practical proof were needed of the efficiency of the mechanical killer, he would merely state that of the 1,200 odd local authorities who had contracted sheep and lambs into the protection afforded to other animals, not one had rescinded its decision, nor had any complaint been received from the 95 per cent. of slaughter-houses where power was available and pigs must be stunned. All the big bacon factories used the electric method. As for the cost, it was entirely negligible. It amounted to three farthings on a carcase, once the initial cost of the weapon had been defrayed.

Referring to ritual slaughter by Jews and Moslems for their requirements, Lord Dowding said it was unfortunate that the specific immunity granted under subsection (1) (*b*) of the first section of the Act should undermine the law in all slaughter-houses where the two methods were practised concurrently. If a complaint was made that the law was being broken, it was only necessary to plead that the infractions were due to the requirements of the Jewish population and the issue was hopelessly clouded.

The other point in connection with this immunity was that it was granted specifically as regards animal slaughter without "unnecessary suffering" and for the food of Jews and Moslems. This latter proviso was openly flouted. Many more beasts were killed by the Jewish method than were required by the Jews. The balance were sold to Christians. As regards the former proviso, that animals should be slaughtered without "unnecessary suffering," he did not know what was in the minds of those who drafted the Act when they spoke of "unnecessary suffering." What suffering did they consider to be necessary?

He made the bold assertion that the partial statutory protection under the Act was habitually set aside in all slaughter-houses. If it was observed anywhere, it was only because of the humanity of the management. The conditions might be even worse than he feared, because in these days it was not easy to find out what went on in slaughter-houses. Accredited officers of humanitarian societies had been refused access to slaughter-houses. Take, for instance, the case where the supply of cartridges for the humane killer ran out, either through faulty prevision or for some other reason: was anybody so simple as to suppose that the process of slaughter came to a standstill? He had now finished what he had to say on sections (*a*) and (*b*) of his Motion. He maintained that the conditions constituted a blot on the national conscience. They could be removed by a stroke of the pen. He urged with all the force at his command that that pen stroke be made.

In regard to (*c*) accommodation, the arrangement and design of slaughter-houses, he agreed that some delay might be unavoidable. It would not be reasonable to press that man-power and material should be expended on slaughter-houses when there were so many human beings who had not a roof over their heads. Nevertheless, the matter was urgent enough. Conditions in some slaughter-houses were a disgrace to a nation which called itself civilised. The first thing that occurred to one was this fantastic proportion of slaughter-houses closed down in relation to those remaining—17,000 to 600. Would it not be possible to mitigate over-crowding, at any rate, in the slaughter-houses by reopening some of the vast number that had been closed? Of course, it was not only a question of overcrowding. Some of the conditions could only be described as atrocious.

There were two kinds of cruelty—the infliction of pain and the infliction of terror. He did not know which was the worse, but he could say that both kinds were perpetrated in full measure, even when the final act was preceded by stunning, when the terrified animals were forced up to the killing point through the sights and sounds of previous operations and the smell of blood and entrails. What were the Government going to do? That was what everyone wanted to know, and what nobody could find out. Were they going to hand the slaughter-houses back to private enterprise? Were they going to hand them over to local authorities? Or were they going to nationalise them? In the interests of decency and humanity this question ought to be answered, so that plans might be considered and might be ready for implementation when the national situation allowed that blot to be removed from the national conscience.

Lord Monk Bretton, making his maiden speech, said that the Englishman, formerly one of the greatest meat-eaters of the world, ought to be able to arrange these matters satisfactorily; it was a subject about which the Englishman had been traditionally conscientious. The present system grew out of the war and the necessity for rationing, and it contained several evils which had come to light. The main evil was that of overcrowding live animals before slaughter. He had visited a public abattoir, and was not convinced of the adequacy of the premises. When he was informed that soon the number of killings in that abattoir was to be doubled, in order to reduce difficulties in other abattoirs, he felt that the position must be growing very serious. The first thing overcrowding caused was cruelty, even if it was unintentional.

Animals were kept too long under bad conditions before slaughtering. That caused also financial loss. Hand in hand with the difficulties of accommodation for live animals went the shortage of hanging capacity for the meat when it had been killed. Those two factors must be partially responsible for the reputation that home grown meat must be acquiring in this country to-day. The whole question needed careful attention. No adequate study of the advantages and economies of central slaughtering seemed ever to have been undertaken; but now that we had had experience of central slaughtering for some time, it might be possible to discover a great deal more about it than we knew before. He believed that there were now doubts about its rigid application, particularly to rural areas. A long-term policy should be considered, although he fully understood that it could not possibly be implemented to-day.

Meanwhile, as had already been stated, every effort should be made to open more slaughter-houses wherever possible. This was the best, the cheapest and the quickest remedy. In regard to the slaughter of meat according to the requirements of the Jewish faith, in the case of slaughter-houses built before 1933, where the full facilities were not available, the slaughter of animals actually in the chamber where the bleeding was done was permitted. That was a loop-hole in the Act to which he thought attention should be drawn. It caused great distress to the animal and was deplored by slaughter-house staffs, who spoke very strongly about it.

The Earl of Selkirk said he wished to ask Lord Huntingdon, first, if he was satisfied with the present statutory position? The 1933 Act had been on the Statute Book for 15 years. It was, of course, common knowledge that that was a private Act. To-day it was impossible for any private Act to be promoted and, therefore, it rested squarely upon the shoulders of His Majesty's Government to say whether they were satisfied with the existing state of affairs, or whether they were not.

Secondly, something over a year ago, in another place, he thought it was Dr. Summerskill who said: "There is no widespread cruelty." He did not think anybody suggested there was widespread cruelty, but he would ask: was there any assurance that there was adequate inspection? Supposing there were widespread cruelty, how would the noble Lord know? He believed he was right in saying that all, or virtually all, public slaughter-houses—indeed all abattoirs—were under the control of the Ministry of Food. Therefore, His Majesty's Government had a direct responsibility in this matter. He would like to ask whether there was adequate inspection both in the cattleyards and in the matter of slaughter itself. He submitted that it was not enough to say that every official at an abattoir was necessarily an inspector: he did not think that was the case. The inspection in this matter was a special task, which should be undertaken only by those who were specially detailed and specially qualified to do so. He would like to press the point which Lord Dowding made—that there should be permitted the entry of accredited representatives of recognised socities.

Government Reply

The Joint Parliamentary Secretary, Minister of Agriculture and Fisheries (The Earl of Huntingdon) said, in the course of his reply, that there would be complete agreement on all sides of the House that they should, so far as possible, ensure that the most humane methods would be used in any necessary slaughtering of animals. After that they came upon some practical difficulties, and it was only fair to say, looking at the question from the other side, so to speak, that this country was in the forefront in regard to the measures and precautions taken to ensure that cruelty was reduced to the minimum. It was not the case, however, that they thought there was no room for improvement. Obviously, the Government were only too glad to hear the views of their Lordships upon this matter and to look into any possible steps that might be taken to improve conditions or to eliminate abuses. But when they came to the

facts one saw that the problem was rather more difficult than perhaps at first it seemed.

He would like to begin by concentrating on the question of animals killed in licensed slaughter-houses. Cattle and calves must be "instantaneously slaughtered or by stunning be rendered insensible to pain until death supervenes." This should be done by mechanically operated instruments in proper repair. In regard to them, he did not think one could criticise or improve the conditions and rules which had been laid down. In regard to pigs the matter was slightly different. In slaughter-houses pigs should be and were, whenever possible, stunned by electricity, but it was quite true that where electricity was unavailable it was not possible for this practice to be followed. He was informed that in the Ministry of Food slaughter-houses pigs were stunned before actually being killed.

With regard to sheep and lambs, the question was left to the discretion of the local authority. As Lord Dowding had pointed out, of the 1,440 local authorities—that was the figure, according to his information—1,200 insisted on sheep being stunned, whereas 240 had not come into these arrangements. As regards the killing of goats and pigs, those animals could be excluded by a local authority from the protection given by the Act, if the local authority so wished; however, the animals had to be stunned unless the local authority passed a resolution to the contrary. Actually, there was a very small number of these animals killed in slaughter-houses. He had not been able to get the number of local authorities who had opted out of this provision, but he should think it was very small.

The point which surprised him in Lord Dowding's speech was his objection to the reduction of the number of slaughter-houses from about 16,000 to approximately 600. His implication seemed to be that that was a reactionary step. He (Lord Huntingdon) should have thought that in practice it was an improvement, because before the war slaughtering was carried out in all sorts of little backyards, knackers' yards and so forth, in which no adequate inspection could possibly be made or enforced; whereas getting slaughter-houses under central inspection was surely the first elementary step to ensure that proper measures were taken.

The methods of Jewish and Mohammedan slaughtering presented an extremely difficult problem. Those methods were excluded from the Act, the reason being that under Mosaic and Moslem laws animals had to be killed by an authorised slaughterer and according to a certain ritual. How great the suffering was compared with that caused by the humane killer he was not prepared to say—he believed there was some doubt among experts. If they brought in a law or regulation which stopped this method of slaughter, then automatically they would be stopping the supply of meat to a large part of the community at a time when, first, food was extremely short and not only meat but potatoes and bread were rationed and secondly the Government had had to call on everybody for the maximum amount of effort and exertion. This was a matter not for his own Department but for the Ministry of Food; and it was the opinion of the Minister that legislation could not be introduced to alter the present position. However, there was one device which had perhaps eased the situation a little, and that was the Weinberg Pen. This reduced very considerably indeed the time taken for this method of slaughter, by holding the animal and turning it round so that it could be slaughtered much more quickly than in former times. He asked their Lordships to realise the problem that the Government had to face in regard to the slaughter of animals for the Mohammedan and Jewish communities.

Slaughter on Private Premises

He came now to another point which was also difficult—the question of private premises. Could any legislation be brought in which would ensure absolutely that all animals killed on a farm or on private premises were killed humanely, or as humanely as possible? It was not a question of their being unwilling to secure that end, if it could be obtained, but they were up against big difficulties. The greatest perhaps was the question of inspection. Some farms—and other premises—were in remote districts, and it would be almost impossible to maintain continual and adequate inspection of all those premises. There was no point in bringing in legislation which could not be rigidly enforced.

The second difficulty was that of cost. It was suggested by Lord Dowding that the humane killer should be used universally, but it would be difficult to compel every farmer to buy what was quite an expensive instrument and not in plentiful supply. It was, too, an instrument that must be used by someone who was skilled in using it; otherwise the cruelty and suffering that might be caused would be even worse than that occasioned by other methods. For these reasons, it was difficult to maintain that thousands of farmers should be compelled to possess, and taught how to use this particular instrument.

A very important question was raised by Lord Monk Bretton, that of the construction and the capacity of premises. He had no illusions about the fact, nor did they believe that all was well in regard to premises used for slaughtering. They knew what conditions were needed, and they envisaged a time when slaughter-houses would be properly constructed and adequate. But in these days of acute difficulty in regard to materials—steel, bricks, timber and everything needed for building—when we were crying out for factories and for houses for the people who still had not a roof over their heads, the improvement of slaughter-houses was not a reform that they could immediately bring into operation. That did not mean that the matter was not very much in their minds, or that they did not appreciate the necessity for extending and improving slaughter-house premises. Some of them were badly dilapidated, but that did not necessarily mean that inhumane methods of slaughter were used in them. They tried to ensure that everything possible that could be done should be done to prevent cruelty. Lord Selkirk had asked, how did they inspect those premises to make sure that cruelty was avoided as much as possible? There was a system by which Ministry of Food inspectors examined these premises. He agreed that the accredited representatives of the societies——

The Earl of Selkirk: "Are these Ministry of Food inspectors not veterinary inspectors who inspect meat, rather than the methods of killing animals?"

The Earl of Huntingdon said that so far as his information went, those inspectors were quite definitely given instructions not only to examine the meat but also to see that everything was carried out in a regular and proper fashion, and that cruelty was not practised in any way. He did not know that the accredited representatives of societies were not allowed into the slaughter-houses. This had, however, been brought to his attention, and he would bring it to the notice of his right honourable friend. Then there was the general question of premises, which he thought was a vital one. At that moment they were examining the Lucas Report on marketing, and the planning of slaughter-houses. The Report would have far-reaching effects—not only on marketing and slaughtering—but he could not say what would be their future plans concerning slaughter-houses until that Report had been discussed further and they decided what the policy would be in regard to distribution of meat, slaughtering and everything else.

Public Opinion

He would suggest to their Lordships that the chief weapon they had against any cruelty or barbarity in this matter was public opinion. They should pay a tribute there to men like Lord Dowding, and to the societies which had carried on their campaigns to educate the public on this matter. It was the gradual awareness of the public which would make cruelty impossible. One of the difficulties which he understood his right honourable friend was up against was the fact that people would not come forward and report cruelty when they saw it. Occasionally reports were received of animals being driven to the slaughter-houses with unnecessary violence, and of the infliction of undue punishment, but they could hardly ever pin down someone who would come forward and give them the facts. It was an obligation, because under the Protection of Animals Act it was the duty of any policeman to arrest without warrant anybody who was inflicting cruelty on animals. If anyone would inform either the police or the local authority of the facts they would if necessary immediately institute proceedings. He was afraid that what he had said might in some ways be unsatisfactory, but he hoped he had been able to convince their Lordships that they had taken note of that subject. They hoped that when they had framed their policy in regard to marketing, they could take great steps towards regulating the whole position concerning abattoirs, and the collection of animals and their despatch in the most humane possible way.

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Animal Feeding-stuffs (Rations): Minister's Statement in the Commons

In the House of Commons on March 24th, the Minister of Agriculture (Mr. T. Williams) made the following statement on supplies of feeding-stuffs for stock:

In the announcement made on August 21st last about the agricultural expansion programme it was indicated that, so far as could then be foreseen, increased quantities of feeding-stuffs from abroad should become available by 1949. In the meantime the target acreages for wheat and barley were raised in

order that 20 per cent. of both of these crops might be retained on the farm without reducing the amount available for human consumption. The Government has now completed a survey of present and prospective supplies of animal feeding-stuffs, home produced and imported. Large increases in imports have in fact been made, particularly under the recent trade agreements with Russia and the Argentine, and maize imports this year have been running appreciably higher than at the corresponding period last year, but the light home crops last harvest and the continuing world scarcity of bread grains for human consumption make it necessary to exercise prudence. It is therefore impossible to increase rations for any class of livestock for the rationing period beginning May 1st, 1948, having regard to the significant increase in numbers of poultry and breeding pigs compared with a year ago. The higher ration scales now in force and the permitted retention of grain from the 1948 crops, should suffice to maintain this larger pig and poultry population. Increases in ration scales can only be made when there is assurance of adequate supplies to honour ration coupons over a reasonably long period ahead.

In the meantime my right hon. Friend the Secretary of State for Scotland and I are examining the possibility of modifying the present method of rationing pigs and poultry so that some rations may be allowed for these classes of stock on holdings which are not now entitled to a basic ration but on which the occupiers would propose to keep pigs or poultry. Such an extension of the scope of the rationing scheme will have first consideration whenever further supplies of feeding-stuffs become available.

As I have already announced, pig and poultry keepers can rest assured that present ration scales, including the customary seasonal increase for poultry during the summer months when young pullets for replacement are being reared, will continue without reduction up to April 30th, 1949. In addition, those pig and poultry keepers who grow wheat or barley will have for the use of their stock up to 20 per cent. of their barley and wheat from the 1948 crop, or an allowance of coarse grains in substitution.

Captain Crookshank: May I ask the right hon. Gentleman if there is anything new at all in the very disappointing remarks which he has just addressed to us?

Mr. Williams: Yes, Sir. The statement is all new to those hundreds of thousands of farmers who are waiting in the expectation of hearing, I imagine, of increased rations, which, unfortunately, they cannot be given.

Captain Crookshank: As the Minister has summarised what he has said as meaning that there is no chance of any improvement during the present period, does it not, therefore, mean that the promises held out by the Lord President of the Council in August have, as usual, failed to fructify?

Mr. Williams: The right hon. and gallant Gentleman has absolutely misconceived my statement. I said that there was no likelihood of an increase in the rations on May 1st this year, but I did not say anything about the whole of the ration year.

Mr. Spence: Will the right hon. Gentleman make a definite representation to his colleagues in the Cabinet that the policy of buying finished products instead of feeding-stuffs to enable us to produce food has led to the present situation?

Mr. Williams: The House must be aware that the Government are buying coarse grains in any part of the world where those grains exist.

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Questions

Colonial Service Salaries, East Africa

On March 25th, Mr. Hurd asked the Secretary of State for the Colonies when he expects the Salary Commission will complete the review of Colonial Service Salaries in East Africa.

The Secretary of State for the Colonies (Mr. Creech Jones): I expect to receive the report of the Commission at the end of this month.

Mr. Hurd: Is the Minister aware that district officers and others lower in the hierarchy, who are doing excellent work in East Africa, have not yet received any increase, whereas the senior officials have, and when such increases are made, will he make them retrospective?

Mr. Creech Jones: I cannot answer the last part of the hon. Gentleman's question, but it was because of this that the Commission was appointed.

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Scientific Man-power

Mr. Janner asked the Chancellor of the Exchequer how the output of scientific man-power in this country at the present time compares with the estimates made and targets set by the Barlow Committee; and how the estimates with regard to the output of such man-power during the next five years now compare with the Barlow Committee figures.

Mr. Jay: The Barlow Committee recommended the doubling of the pre-war output of graduates in Science and Technology as soon as possible. On the best estimate available this increase will be realised within the next two years and is likely to be maintained thereafter. Expansion beyond that level depends upon the rate at which additional accommodation can be provided at the universities.

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Paper for Educational Text-books

Mr. Bramall asked the President of the Board of Trade whether book publishers are free to publish any books they like with the paper allocation they receive; or whether there is a system of allocation to ensure that a proper proportion of available paper is used for the production of educational text-books.

Mr. H. Wilson: I would refer my hon. Friend to the reply I gave to my hon. Friend the Member for Tradeston (Mr. Rankin) on November 13th last.

Mr. Bramall: Can my right hon. Friend give an assurance that this reply does indicate that it is possible that educational books, of which there is a terrible lack at the moment, do have a priority over much less essential publications which are appearing?

Mr. Wilson: Yes, Sir. We do all we can for educational books, subject to this—we are not prepared to use paper allocation for purposes to dictate to the publishers what books they must publish.

Mr. Wilson Harris: Will the right hon. Gentleman give an assurance that when paper supplies for books improve, very special priority will be given to educational books?

Mr. Wilson: Yes, Sir. We shall always have in mind an increase of the paper required from special reserve.

NOTES AND NEWS

Diary of Events

April 10th.—Annual General Meeting of the Association of Veterinary Inspectors (Ministry of Agriculture and Fisheries), at the Royal Veterinary College, N.W.1, 2 p.m.

April 13th.—Meeting of The Association of Veterinary Teachers and Research Workers at the University, Brownlow Hill, Liverpool, 11 a.m.; to be preceded by Annual Meeting of the Northern Region, at 10 a.m.

April 13th.—Scientific Meeting of the Zoological Society of London, at the Zoological Gardens, Regent's Park, N.W.8, 5 p.m.

April 14th.—Meeting of the Editorial Committee, N.V.M.A., at 36, Gordon Square, W.C.1, 2.30 p.m.

April 14th, 15th and 16th.—Quarterly meetings of Council, R.C.V.S.

April 16th.—Meeting of the Mid-West Division, N.V.M.A., at Bristol (Berkeley Café, Clifton), 2.15 p.m.

April 16th.—Meeting of the Lincolnshire and District Division, N.V.M.A., at Grantham, 2.15 p.m.

April 21st.—Meeting of the Royal Microscopical Society at B.M.A. House, Tavistock Square, W.C.1 (Hastings Hall), 5 for 5.30 p.m.

April 22nd.—Meeting of the South-Eastern Division, N.V.M.A., at Maidstone (Royal Star Hotel), 2.30 p.m.

April 30th.—Meeting of the Yorkshire Division, N.V.M.A., at York (Royal Station Hotel), 2.30 p.m.

May 4th.—Animal Management Examination commences at London.

May 4th.—R.C.V.S. Nominations to Council (last date).

May 10th.—Entries due for D.V.S. Examination.

May 14th.—R.C.V.S. Voting Papers issued.

May 18th.—R.C.V.S. Pharmacology, etc., Examination (revised syllabus).

May 25th.—R.C.V.S. Voting Papers to be returned.

June 1st.—R.C.V.S. Annual General Meeting.

June 1st.—V.V.B.F. Annual General Meeting.

June 7th-8th.—R.C.V.S. D.V.S.M. Written Examination.

June 24th-25th.—R.C.V.S. Membership Written Examinations.

Sept. 8th to 15th (inclusive).—N.V.M.A. Congress at Southport.

The Veterinary Surgeons Bill, 1948

With this issue of the *The Veterinary Record* we are circulating, as an "inset," the text of the Bill "to make further provision for the teaching of veterinary surgery and for restricting its practice by unqualified persons; and to alter the constitution of the Royal College of Veterinary Surgeons and of the Council of the College, and otherwise amend the law relating to veterinary surgeons; and to exempt persons practising veterinary surgery from practice on juries." The inset also includes explanatory memoranda by the Registrar of the Royal College. Distribution is being made to the whole profession, and if any member of the N.V.M.A. fails to receive his copy through the medium of *The Veterinary Record* intimation should be made to the Registrar at 9, Red Lion Square, London, W.C.1.

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PERSONAL

Appointment.—Capt. S. R. Rippon has, following the transfer of powers to an independent Burmese Government, relinquished his former appointment as Director of Veterinary Services, Burma, and sails from this country on April 9th to take up the appointment of Veterinary Officer, North Borneo.

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Births.—Dunbar.—On March 30th, 1948, to Pamela, wife of G. M. Dunbar, M.R.C.V.S., Eccleshall, Staffs.—a daughter.

Groves.—On March 28th, 1948, at Redlands Hospital for Women, Glasgow, W.2, to Jean, wife of T. W. Groves, B.Sc., M.R.C.V.S., a son—Nicholas David Wilson.

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Death.—White.—At Kabete, Kenya, suddenly on Saturday, March 20th, Angela Valine, aged four years, second daughter of Dr. and Mrs. Edwin White.

Much sympathy will be extended to Dr. and Mrs. White in their bereavement so soon after their arrival in Kenya. "Angela's death, though not unanticipated, as she had a congenital heart defect, was none the less a blow to her parents and to the laboratory staff" (writes a colleague). "She contracted a cough and slight bronchitis, and had apparently overcome the infection and was thought to be out of danger when her heart gave out and she passed away quite suddenly."

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Dr. Russell Greig Honoured.—Dr. John Russell Greig has been elected the first Honorary Associate of the North of Scotland Division of the National Veterinary Medical Association since the organisation's foundation in 1894. An illuminated scroll was presented to Dr. Greig at the divisional meeting in Aberdeen, in appreciation of his veterinary research work.

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HEALTH SERVICE DISPUTE

Move by Royal College of Physicians

With a view to narrowing the difference between Mr. Bevan and the medical profession on the issue of "professional freedom," regarded by the latter as essential to its independent existence, the Royal College of Physicians has sent to the Minister of Health two resolutions on the future of the National Health Service. In one, Mr. Bevan is asked to bring in an amending Bill to make impossible the introduction of a whole-time service by regulation.

The resolutions read:—

(1) "The College affirms its desire for unity and recognises that the comprehensive health service cannot be successful without the willing co-operation of all branches of the profession. The College believes that this can be furthered if the Minister of Health makes clear in an amending Act that a whole-time service shall not be brought in by regulation; so that if any future Government desires to introduce such a service, a fresh Act of Parliament would be required. The College reaffirms its opposition to a whole-time medical service."

(2) "A principal cause of the present discontent with the National Health Service is the power possessed by the Minister of Health to change its character by regulations. The College therefore suggests that an amending Bill should be introduced, to make regulations affecting the National Health Service subject to special procedure."

LEGAL NOTES

Failure to Notify Anthrax

The *Burnley Express and News* reports that at Reedley Magistrates' Court, Joseph Boothman, of Riley's Farm, Habergham Eaves, was fined £20, plus special costs of £2 12s. 6d., for having been in possession of a cow infected with anthrax and failing to notify the police.

Prosecuting, Supt. Pickering said that defendant found a cow on his farm to be shivering, staggering and obviously ill. He communicated with a veterinary surgeon in Burnley, but before his arrival the animal collapsed and died. Defendant later had it removed into the farmyard, where he "bled" it by cutting its throat. He cancelled the veterinary surgeon's visit, although, as an experienced farmer, he ought to have known that the symptoms he had noticed were the outstanding symptoms of anthrax. The prosecution alleged that the blood from the cow flowed in the farmyard for a distance of ten yards to a drain.

Defendant had the carcase removed to the abattoirs at Burnley, where, fortunately, it came under the supervision of a meat inspector and the Borough Veterinary Officer (Mr. J. King Shaw), who found the animal to be infected with anthrax.

Supt. Pickering mentioned that eleven persons had to receive preventive treatment in hospital as possible "contacts" with the blood of the animal. The discovery resulted in a dislocation of business at the abattoirs. Had the defendant reported the matter when he first noticed the cow's condition he would have received every assistance from the authorities, but instead of doing so he adopted the course of disposing of the carcase as a "casualty" at the abattoirs, intending it for human food, "just to save and recover what money he could," the Superintendent alleged.

Evidence was given by Louis N. Brunskill, Meat Inspector employed by the Corporation, that his suspicions were aroused after the animal had been unloaded from a wagon, and he called the veterinary officer. On his arrival, three slaughtermen were engaged on dressing the carcase.

Mr. J. King Shaw said that following his examination he immediately ordered all work to be stopped. He arranged for the defendant, members of his family and other persons to receive prophylactic penicillin treatment at the Municipal Hospital.

Mr. Shaw told the magistrates that if this animal had been accepted at the "casualty" rate at the abattoirs, its value would have been from £12 to £15. On the other hand, any animal affected with any form of acute febrile disease must obviously be unfit for food.

Questioned by Supt. Pickering as to the symptoms which defendant had told witness he noticed in this cow, Mr. Shaw said that these—shivering, increased respirations, staggering and collapse—might follow one another in as short a period as two hours, but they never extended beyond twelve hours.

In this case he was of the opinion that the defendant should definitely have suspected anthrax. He did not use reasonable diligence to obtain confirmation. Witness added that the Corporation had been involved in expense of approximately £50 as a result of this case.

P.S. Blenkinsop said that defendant, after being cautioned, stated that when he went into his cowshed about 8 a.m. on February 14th he noticed that this cow was shivering and blowing and did not appear to be well, although she was quite warm. "I thought she had got a bit of cold," the statement continued, "and my wife rang for the 'vet' right away. About 9.30 a.m. the cow fell down in the stall, and in about a quarter of an hour died."

When told he would be reported, Boothman said: "I had no idea it was anthrax or I would not have done what I did." Witness pointed out to him that he should have obtained skilled opinion before disposing of the carcase, and defendant replied: "My mistake was in cancelling the 'vet'."

The Chairman, announcing the magistrates' decision, said they considered it a very serious case.

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HORSE-MEAT "RACKET" ALLEGATIONS

Slaughter of Sound Animals and Cruelty Factors

In its issue of March 24th, the *Birmingham Gazette* observes: "Racketeering in horse-slaughtering and the sale of horse-meat, with as much as £50 to £60 being paid for horses, has reached the stage where many small slaughterers will soon be forced out of business. That was made clear last night following a veterinary surgeon's statement in Dudley County Court earlier yesterday that the demand for horses had increased by 500 per cent. in the last few months.

"An official of Harrison, Barber and Co. Ltd., of Nechells, Birmingham, said that, with the controlled price of horse-meat at 1s. per lb. for human consumption and 8d. per lb. for animal consumption, few legitimate slaughterers could afford to pay more

than £25 for horses. 'Yet every week we have to compete in open markets in Birmingham and Lichfield against racketeers who will pay double that price,' he added. 'Whether the horses are sold for work or slaughter makes no difference to these people. And if they are paying that price you can bet they're making a profit on it. Presumably the meat goes to black-market restaurants.'

"Mr. Albert Patrick, of Short Heath, one of the many small slaughterers in the Midlands, said that he was unable to compete against the racketeers, and would probably have to close down his business. 'I just can't get horses for the price I pay,' he pointed out.

"Slaughterers all agree that scores of horses fit for many years' work are being killed to provide food. The R.S.P.C.A. says that a large number of horses are being imported from Ireland—many of them not fit to travel—and large prices are being paid for them. 'In many cases, horses sold for slaughtering are fetching a better price than those sold for work,' said Mr. W. Eyton Davies, secretary of the R.S.P.C.A., in Birmingham, last night. 'It's a damnable thing that these wonderful servants of man are being butchered for the sake of horse-meat.'

"Mr. Ben Davies, the veterinary surgeon who gave evidence at Dudley yesterday, said last night that he had good authority for his statement that the demand for horses had risen by 500 per cent. 'Only a few days ago,' he said, 'I saw a truck-load of yearlings and three and four-year-olds which had never been broken, pass through Dudley on the way to the slaughterers. The butchery of horses for human consumption is one of the reasons for the loss of about 60,000 horses in 1947.

"'There is a tremendous amount of cruelty being perpetrated in the transport of these animals to the slaughterhouse. Accounts have been heard of horses being left on sidings for many hours without food and water. At the recent annual conference of the National Federation of Saddlers and Leather Goods Retailers, great concern was expressed at the large scale slaughter of useful horses and ponies,' added Mr. Davies. 'A delegate from Suffolk stated that even well-bred Suffolk young stock were being purchased and destroyed.'"

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BELGIAN VETERINARY STUDENTS IN BRITAIN

The British Council arranged a programme of visits for a group of Belgian veterinary students who recently made a short stay in Britain.

The students are all in their final year at the "Ecole Vétérinaire de Cureghem." Heading the group was Professor Emile Paul Cordiez and M. Alex Philippe Granville, Assistant at the School.

Their programme included visits to the Burroughs Wellcome laboratories at Beckenham; the Ministry of Agriculture's veterinary laboratory at Weybridge; the Royal Veterinary College; Reading University farm and the Ministry of Agriculture cattle breeding centre at Reading; and the abattoir at the Metropolitan Cattle Market at Islington.

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"THE VETERAN"

In our issue of December 6th, 1947, we welcomed the first issue of *The Veteran*, produced jointly by the Glasgow Veterinary Branch of the British Legion and the Students' Representative Council of Glasgow Veterinary College.

The Editor, Mr. Cecil Schwartz, writes: "The G.V.C. Branch (British Legion) have now handed the magazine over to a Magazine Council of representatives from various organisations within the College. We hope to maintain the standard which has been set by the first issue.

"The Council is approaching graduates of the College for their support and also for their contributions, so that we may be able to maintain those ties so desirable between practitioners and students.

"May we, through your publication, send an invitation to all members of the profession and not only Glasgow graduates, to help us with our future issues by forwarding contributions for insertion, as well as advance orders for the next issue.

"Without encroaching on the province of established veterinary journals, *The Veteran* hopes to print articles from members of the profession which though not necessarily technical, contain matter of interest to other members or potential members."

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ADDRESSES OF DISEASE-INFECTED PREMISES

The list given below indicates, first, the county in which are situated the premises on which disease has been confirmed, followed by the postal address and date of outbreak.

Sheep Scab:

Derbyshire.—Hayridge Farm, Ashopton, Sheffield (Mar. 30th).
Lancashire.—Sweetings Farm, Cockerham, Lancaster (Mar. 25th).

DIAMOND JUBILEE OF JOHN BOYD DUNLOP'S INVENTION OF THE PNEUMATIC TYRE

Ten years ago we devoted space to the golden jubilee of the invention of the pneumatic tyre by John Boyd Dunlop—also celebrated "in his own right" as a very successful veterinary practitioner in Belfast.

In its issue of February 28th, *Modern Transport* publishes the following account of this revolutionary invention—the term perhaps is apt—on the occasion of its diamond jubilee.

John Boyd Dunlop was 48 when he invented the pneumatic tyre. His father was a farmer. He himself was born in the village of Dreghorn, Ayrshire, on February 5th, 1840. Growing up there amidst livestock, he became interested in their ailments and went off to study at the Royal Veterinary College, Edinburgh, where he qualified as a veterinary surgeon at the early age of 19. Three years later he went to Belfast, where he built up a considerable practice and reputation. It is probable that he turned his mind to the problem of the "unsprung weight" of the road vehicles of that day as he jolted along in his dog cart from one farm to another. First he had the idea of a spring wheel; then he thought of filling a tube with air.

His son, Johnny, aged ten, had a tricycle. Dunlop decided to try out his idea on it. He cut out a wooden disc some 16 inches in diameter and shaped a tube from sheet rubber one thirty-second of an inch thick, putting a small air-inlet pipe like that of a football into it at the point where the ends met. He blew the tube up with a football pump, closed the inlet and fixed his tube of air to the wooden disc with a strip of linen nailed to the rim. He then took the front wheel with its tyre of solid rubber from Johnny's tricycle and went out into the yard to test it and the pneumatic tyred disc against one another. First he rolled the tricycle wheel along the yard. It wobbled and fell over before going the full length. Then he tried his pneumatic tyre, putting as far as he could judge the same force behind it. It raced across the yard and bounded back from the gate at the far end.

Canvas Bags and Sheet Rubber

From that bound issued the fleets of motor vehicles speeding to-day across the highways of the world and its aircraft in the skies overhead. It was the autumn of 1887. Two months later Dunlop carried his idea a stage further. He bent two strips of elm wood 9 feet long, 3 inches wide and ¼ inch thick into hoops about 3 feet in diameter, riveting the ends together. From the same sheet rubber as before, he made two air tubes to fit these wooden rims, drawing them into canvas bags and slipping in a small air supply tube before joining up the ends with solution. The valve was simply a strip of rubber fixed across the inner end of the air supply tube. The canvas bags were covered with a thickness of sheet rubber with two extra thicknesses on the tread. The two crude tyres were then solutioned on to the rims of elm and the rims themselves bound with copper wire to the two big wheels of Johnny's tricycle.

The job was done 60 years ago, on February 28th, 1888, and on the night of that day Johnny pedalled out into the moonlight, the first human being to ride on pneumatic tyres. They were lighter than his solid tyres, of course. They were more comfortable. He could go faster on them. But would they wear? The point was critical. Anxiously in the morning Dunlop went to examine them. Not a scratch was to be found.

The Patent

His next step was to buy from a firm of Belfast cycle dealers (W. Edlin and Company), a Quadrant tricycle without wheels. For this he himself built the wheels, using American elm, 2 inches wide, for the rims. He fitted pneumatic tyres to the rear wheels of the machine, with a solid rubber tyre on the front wheel, as an air tyre there would have rubbed against the forks when steering the tricycle round corners. The new development was so satisfactory that in July, 1888, he took out the following patent:

No. 10607 A.D. 1888

Date of application, July 23rd, 1888

Provisional Specification

I, John Boyd Dunlop, Veterinary Surgeon, 50, Gloucester Street, Belfast, do hereby declare the nature of this invention to be as follows:

A hollow tyre or tube made of indiarubber and cloth, or other suitable material, said tube or tyre to contain air under pressure or otherwise and to be attached to the wheel or wheels in such a method as may be found most suitable.

Dated this Twentieth day of July, 1888.

John Boyd Dunlop.

Edlin and Company, quick to see the possibilities of the invention, began to build bicycles specially for it. In the *Irish Cyclist* of December 19th, 1888, the new machine was advertised in these words:

> "Look out for the new Pneumatic Safety. Vibration impossible. Sole makers, W. Edlin & Co., Garfield Street, Belfast."

The first of the bicycles on pneumatic tyres was ridden for 3,000 miles. Its front tyre was never punctured or removed from the rim. It can be seen to-day in the Royal Scottish Museum, Edinburgh.

Interest, at first sceptical, spread. Many of the new bicycles were sold and their success was finally established beyond argument by William Hume, captain of the Belfast Cruisers' Cycling Club. After a nasty accident Hume had intended to retire from racing but he decided to appear at the first meeting open to "safeties," the Belfast Queen's College Sports on May 18th, 1889. Here, on a bicycle fitted with the new tyres, competing against some of the best known riders in Ireland on "solids" he won from them all four events for which safeties could enter. John Boyd Dunlop's victory was complete.

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OVARIAN ACTIVITY IN THE PREGNANT MARE

Professor E. C. Amoroso, of the Royal Veterinary College, and Mr. J. L. Hancock and Dr. I. W. Rowlands, of the Wellcome Veterinary Research Station, Frant, contribute the following communication on the above subject to the Correspondence columns of the March 6th issue of *Nature* (**161**. 355).

Ovarian activity in the mare in early pregnancy presents some unusual features which are inconsistent with the accepted normal behaviour of the mammalian gonad during gestation. In the first place, the corpus luteum of pregnancy is very short-lived, and unlike that of most other mammals its period of activity would not seem to be prolonged much in excess of that of the oestrus cycle of the non-pregnant animal. Harrison[1] has observed that the corpus luteum of pregnancy completely fills the cavity of the ruptured follicle in four to six days and attains maximum size by the tenth to fourteenth day. Regression is stated[2] to occur at about the end of the first month. Secondly, follicular development is a common feature of ovarian activity at this time, and Day[3] has observed the occurrence of ovulation in a mare on the twenty-third day of pregnancy. Ovarian activity reaches its peak during the second and third month of pregnancy, when gonadotrophic hormone is abundant in the blood.

Ovulation of the many Graafian follicles which are brought to maturity by these hormonal means was recently doubted,[4] but a more extensive search has now shown that it occurs in a high proportion of pregnant mares. To date we have recovered one or more ova from the Fallopian tubes of nine of 14 mares which have been examined *post mortem* when 46-73 days in foal. The ovaries of all these 14 mares contained one or more fully formed corpora lutea; but in none, with the possible exception of one mare examined on the 46th day, could the primary corpus luteum of pregnancy be recognised. It is highly probable that during this stage of pregnancy a succession of follicles ovulate, from which corpora lutea are rapidly formed to maintain gestational requirements. Of the nine mares from which ova were recovered, ovulation had occurred in five from the right, in two from the left, and in the remaining two from both left and right ovaries. In all, 15 ova were recovered, nine from the right and six from the left Fallopian tubes; three of the latter were found in one tube. The corpora lutea of the whole series were distributed in a proportion of 22 to 18 between the left and right ovaries. There is no reason, therefore, to suppose that the frequency of ovulation between the two ovaries is dissimilar.

Our observations on ovulation during the oestrous cycle, however, show that it occurred more frequently in the left ovary, and our findings are in close agreement with the extensive data of Kedrov.[5] We have palpated per rectum 24 mares during 45 cycles and have observed that of 36 single ovulations 22 occurred in the left and 14 in the right ovaries, and that of nine twin ovulations four took place in the left ovary and the remaining five involved both ovaries. This greater activity of the left ovary is of interest especially in view of Kedrov's findings that implantation occurs more frequently in the right horn of the uterus. Last summer we examined, either *post mortem* or by rectal palpation, the uteri of 15 mares carrying single pregnancies, of which 13 were implanted in the right horn. Only in four of these 13 mares could we be certain that ovulation at the time of mating occurred in the right ovary alone. In another eight it was established that ovulation took place only in the left ovary. We have encountered twin pregnancy in five mares; in two of them the ovulation of two follicles was recognised, at the time of mating, as having occurred in the left ovary. Foetal migration occurred in both mares; in one, a foetus had become implanted in each horn, and in the other the right horn contained both conceptuses. In this small series of 20 pregnancies, foetal migration had occurred in ten mares, the direction of the migration being in all instances from left to right. A high incidence of foetal migration was reported by Day, but, unlike us, he observed its occurrence in both directions within the uterus.

We have undertaken preliminary investigations on the fertilisability of the ova which are discharged from the ovaries in early pregnancy with the ultimate object of inducing a second concurrent pregnancy and observing the course of secretion of gonadotrophin into the blood. Two pregnant mares in which mature follicles were palpable were injected intravenously with 1,500 I.U. of chorionic gonadotrophin and inseminated artificially with 20 ml. of stallion semen. They were examined four days later after they had been bled to death under anaesthesia. One was found to have aborted a twin pregnancy and no ovum was recovered from the Fallopian tubes. The other, which at the time of injection and insemination was about to ovulate from the left ovary and was pregnant in the right uterus, had not aborted; ovulation had occurred but the ovum recovered from the left tube had not been fertilised. Failure to effect fertilisation in the latter mare is ascribed to the existence of a mechanical barrier to sperm migration presented by a non-patent cervix or by an encroachment of the foetal sac into the non-gravid left uterine horn. It is hoped to exclude the latter possibility by repeating this experiment at an earlier stage in pregnancy.

(1) Harrison, R. J. (1946.) *J. Anat.* **80**. 160.
(2) Kimura, J., & Lyons, W. R. (1937.) *Proc. Soc. Exp. Biol. N.Y.* **37**. 423.
(3) Day, F. T. (1940.) *J. Agric. Sci.* **30**. 244.
(4) Rowlands, I. W. (1947.) *J. Endocrinol.* **5**. xx (*Proc.*).
(5) Kedrov, V. K. (1939.) *Dokl. seljskahaz. Nauk.* 2-3. 65. Quoted by Boyd, J. D., Hamilton, W. J., & Hammond, J., Jun. (1944.) *J. Anat.* **78**. 5.

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TRANSPLANTATION OF MAMMALIAN OVA

Mr. Chapman Pincher, B.SC., a zoologist, writing in the February issue of *Discovery*, reviews the progress made in the transplantation of mammalian ova in rabbits, and discusses the possibility of applying similar methods to cows.

A laboratory technique for the artificial production of abnormally high numbers of rabbit ova has been devised by Dr. Gregory Pincus and his associates at the Worcester Foundation for Experimental Biology at Massachusetts. He used a strain of rabbits which normally set free about nine ova at each ovulation. By giving young does six subcutaneous injections of pituitary extract, at 12-hour intervals, followed by a final intravenous injection, he increased the number of ova to anything between eleven and 80. When adult rabbits which had received this treatment were mated, it was found that the ova were fertilised and developed normally, one doe subsequently being found to have 36 living foetuses in her uterus.

Dr. M. C. Chang, an associate of Pincus, perfected a surgical technique for obtaining the fertilised ova undamaged from the pregnant doe. He then stored the ova at 10° C. for 24 hours and found that some 82 per cent. remained alive, and he proved the vitality of these by transplanting some into virgin does and obtaining living young.

The virgin does first received hormone treatment to stimulate the reproductive system, and 24 hours later four to 15 ova were transplanted by means of a fine syringe into the Fallopian tubes of each doe.

In Chang's experiments four does which had received ova previously stored at 10° C. for 80 to 101 hours gave birth to litters of one to four young. Success was also obtained with ova stored at 5° and 15° C., respectively, over periods from 48 to 102 hours. All the young were healthy and normal, and it is evidently true to say that a laboratory method now exists of rearing abnormally high numbers of rabbits from females of any desired genetical strain.

Folley and Malpress have studied superovulation in cows at the National Institute for Dairying Research, Shinfield. They used 151 fattening heifers and 70 cows destined for slaughter, with ten untreated heifers as controls. Superovulation was induced by pregnant mare's serum, and at autopsy as many as 16 ova were recovered from a single beast. Since publication of these results Dr. Folley has obtained 57 ova at a time, and believes it would not be harmful to obtain up to 200 a year from a healthy cow.

The next step is to devise a method of obtaining the superovulated eggs after they have been fertilised, which does not involve killing the cow. In work not yet published, writes Mr. Pincher, Professor W. E. Peterson, of Minnesota, has recovered one dividing ovum by irrigating the uterus of a cow with a sterile saline solution

some hours after superovulation had been induced, but clearly a new technique will have to be devised. A surgically produced Fallopian fistula is mentioned as a possibility. In any event, it may be soon within the realms of possibility for any high-class dairy cow to provide 50 to 200 high quality calves every year.

Mr. Pincher gives the following references:—

BRAMBELL, F. W. ROGERS. (1944.) *Proc. Zool. Soc.* 114. 1.
CHANG, M. C. (1947.) *Nature.* 159. No. 4044.
FOLLEY, S. J., & MALPRESS, F. H. (1944.) *Proc. Roy. Soc.* (B.) 132. 164.
PINCUS, G. (1946.) *Anat. Rec.* 77. 1.
WHITNEY, L. F. (1946.) *Science.* 103. 654.

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ROYAL AGRICULTURAL SOCIETY

At a Council meeting of the Royal Agricultural Society, Sir Donald Fergusson, G.C.B., Permanent Secretary to the Ministry of Agriculture from 1936 to 1945, was elected an Honorary Member in recognition of his services to agriculture, and he was presented by Lord Halifax (the Chairman) with the Society's Certificate and Badge.

Sir Archibald Weigall reported that the General Purposes Committee were anxiously considering criticisms of the quality of certain classes of cattle exported to South Africa and South America. He felt it was a responsibility of the R.A.S.E. to collaborate with all concerned in maintaining the enviable reputation of British pedigree stock abroad. The "Royal" had been concerned with establishing this reputation over a 100 years and was ready to assist British breed societies and overseas buyers in any way possible.

Mr. E. G. E. Griffith, Denbighshire, raised the question of free service of beef bulls at Artificial Insemination Centres, and declared that the future milk supply of the country might be severely jeopardised if means could not be found to restrict the service to the class of cattle for which it was intended. He regretted to have to say that a danger existed that some farmers with dairy herds would take advantage of the scheme unless they were prevented from doing so. Action before, and not after, service was needed. It was agreed to make appropriate representations to the Ministry of Agriculture.

Lt.-Col. Guy Blewitt, Essex, Chairman of the Stock Prizes Committee, reported on the replies received from horse-breeding societies in connection with the proposal that, apart from Hackneys, only undocked horses should be eligible for exhibition at the Royal Show after 1952. The Committee had had to conclude that the R.A.S.E. could not adopt that proposal for the present in face of the declared opinions of the horse world.

CORRESPONDENCE

The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the N.V.M.A.

Correspondents are requested to write as briefly as possible.

ENCEPHALITIS IN DOGS IN RELATION TO POLIOMYELITIS IN MAN

Sir,—During the past year this country has had the most severe epidemic of acute anterior poliomyelitis on record. During the same period there appears to have been a great increase in the number of cases of encephalitis in dogs. Because of the time association between the human and canine illness this year, there have been communications from a number of quarters in the medical, veterinary and lay press, suggesting that the canine disease was the result of infection with this season's strain of poliomyelitis virus.

Recent investigations by MacIntyre, Trevan and Montgomerie (*Veterinary Record* (1948), **60**, 102) have shown that a disease of dogs, comparatively new to this country, was prevalent at this time. While it simulates true distemper in some of its symptoms, encephalitis occurred in a high proportion of cases. In none of these cases was the histological picture similar to that of human poliomyelitis. There seems little doubt that the prevalence of this disease in dogs at the same time as the poliomyelitis outbreak was no more than a coincidence.

Attempts to infect dogs with poliomyelitis virus in other countries have regularly been unsuccessful. Even so, it seemed worth while repeating these experiments, using a strain of virus obtained from the recent epidemic. The dogs used were of mixed breed, all under one year old, and all were immune to distemper virus.

In the first experiment, three dogs were inoculated intracerebrally under nembutal anaesthesia with 0·1 ml. of a 10 per cent. suspension of first passage poliomyelitis monkey cord. The monkey had been inoculated with brain and cord of a fatal human case in this year's epidemic and the material used for the dogs was proven to be infective at the time by passage into a further monkey. The dogs showed no elevation of temperature or signs of any kind. One was killed after 14 days and two after 21 days. The brains and cords were removed and after representative sections had been taken for histological examination, pieces of brain and cord were pooled, ground as a 20 per cent. suspension and cultured. The tissues from each dog were ground separately. The small number of bacteria present were removed by centrifugation at 3,000 r.p.m. for half an hour in an angle centrifuge.

These suspensions were pooled and inoculated intracerebrally into five more dogs. These remained completely well and two were killed after 22 days and a third passage made of these brains, reinforced with more monkey tissue, into four more dogs. These animals remained perfectly well and one was killed after 35 days for histological examination. The remaining three have remained well up to the fortieth day. No abnormalities could be detected on microscopic examination of the brains.

Tests for neutralising antibodies have not been carried out yet in inoculated dogs.

Thus, distemper immune dogs do not appear to be susceptible to one of the 1947 English strains of human poliomyelitis virus.

Yours faithfully,
F. O. MACCALLUM, M.D.

Virus Reference Laboratory,
Central Public Health Laboratory,
Colindale Avenue,
Colindale, N.W.9.

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THE WORD "BOVINE"

Sir,—The letter from Mr. Willis decrying the use of the word "bovines" in place of "cattle" brings up rather an interesting point, namely, the strange lack in our English language of a singular for the collective noun "cattle." Whereas the words "dog," "cat," "horse," "pig" or even "duck" and "goose" may be used to signify either sex and most ages of the species concerned, "cow," "bull," "bullock" and "ox" have been left only with their narrow meaning and this strange outcome of common usage drives us to the expedient of referring to "bovine animal" or simply to "bovine."

Yours faithfully,
E. L. TAYLOR.

Veterinary Laboratory,
New Haw,
Weybridge, Surrey.
April 3rd, 1948.

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"AN IMPROVED 'FLUTTER VALVE' APPARATUS"

Sir,—The "Improved 'Flutter Valve' Apparatus" in this week's *Record* appears to be almost identical with that published in the *Record*, page 710, 1941.

Yours faithfully,
K. STUART.

Fairmile, Oathall Road,
Haywards Heath.
April 4th, 1948.

DISEASES OF ANIMALS ACTS, 1894 TO 1937, AND AGRICULTURE ACT, 1937 (PART IV).

Summary of Returns of Confirmed Outbreaks of Scheduled (Notifiable) Diseases

Period	Anthrax	Foot-and-mouth	Fowl Pest	Parasitic Mange*	Sheep Scab	Swine Fever
Mar. 1st to 15th, 1948	4	—	34	—	2	2
Corresponding period in—						
1947	5	14	1	—	—	—
1946	5	1	—	—	9	21
1945	5	14	—	1	13	56
Jan. 1st to Mar. 15th, '48	25	—	129	1	18	7
Corresponding period in—						
1947	15	77	2	1	13	10
1946	26	18	—	4	33	133
1945	27	51	—	3	29	229

NOTE.—The figures for the current year are approximate only.
* Excluding outbreaks in Army Horses.